plating

JOURNAL OF THE AMERICAN ELECTROPLATERS' SOCIETY

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Interim Meeting Reporter

Tentative Program—AES 48th Annual Convention

PLATING MAGAZINE

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AMERICAN ELECTROPLATERS' SOC.

MARCH - 1961

University Microfilms
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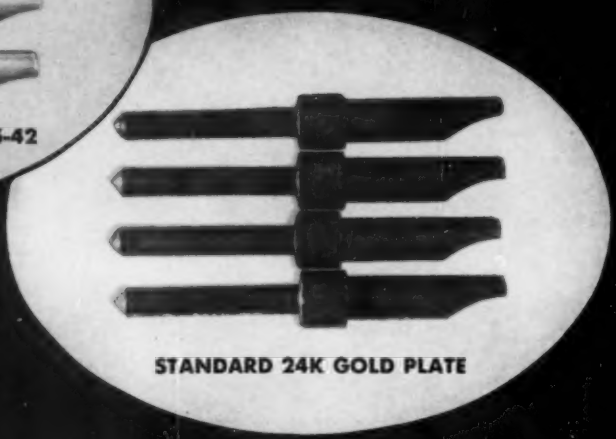
Ann Arbor, Michigan

CANNON ELECTRIC improves contact performance with SEL-REX Bright Gold Alloy S-42

SEL-REX BRIGHT GOLD ALLOY S-42

Cannon plug-contacts, plated with 60-millionths of Sel-Rex Bright Gold Alloy S-42, were unaffected by exposure to an atmosphere of moist hydrogen sulfide. The greater density of the deposit fully protected the base metal from attack.

These contacts plated with 60-millionths of conventional 24K Gold, tarnished and roughened after only one hour's exposure to the moist hydrogen sulfide atmosphere. The granular, micro-porous deposit of conventional gold gave little protection to the base metal.



STANDARD 24K GOLD PLATE

Contacts used in world-famous Cannon Plugs must be capable of withstanding corrosion and tarnish, in addition to the punishing effects of repeated engagement and disengagement. The photographs, taken by Cannon in their own laboratory, show why conventional 24K gold plate failed to meet the requirements of this application.

Both samples were plated with 60-millionths of gold over silver plate, and were photographed after an hour's exposure to an atmosphere of moist hydrogen sulfide. The contacts plated with 24K gold tarnished and roughened – those plated with Sel-Rex Bright Gold Alloy S-42 retained their original mirror-bright finish.

Says Cannon Electric Company, Los Angeles: "Our brass contacts plated with Sel-Rex Bright Gold Alloy S-42 offer exceptional protection against both corrosion and friction-wear. Some of the advantages we have demonstrated in our own laboratory, and what they mean to us, follow:

"**1. Greater Hardness:-** Knoop 140-160 for Sel-Rex Bright Gold Alloy S-42, compared to only 40-50 for conventional 24K gold plate.

"**2. Greater Wearability:-** The S-42 deposit is smooth and bright. This, in combination with hardness, means that less force is required to separate the mating halves of the connector . . . less wear, less tendency for galling."

"**3. Improved Reliability:-** Ordinary 24K gold plate is quite granular and exhibits considerable micro-porosity. Tarnish, corrosion of the base metal and early failure in-service of the plated contact is the end result. The Bright Gold Alloy S-42, being a smoother, far more dense deposit, has demonstrated much greater protection against tarnish and corrosion in all the tests we have performed at Cannon.

"At Cannon Electric, Sel-Rex Bright Gold Alloy S-42 has been instrumental in solving wear and tarnish problems encountered in connectors used in aircraft, and intricate missile and electronic components."

The foregoing is just another of our many case histories which prove that: "From Missiles and Rockets to Misses and Lockets – there's a Sel-Rex Precious Metal Plating Process to help you make your product better, more salable."

For other case histories, technical information and application data, ask for ML-1.

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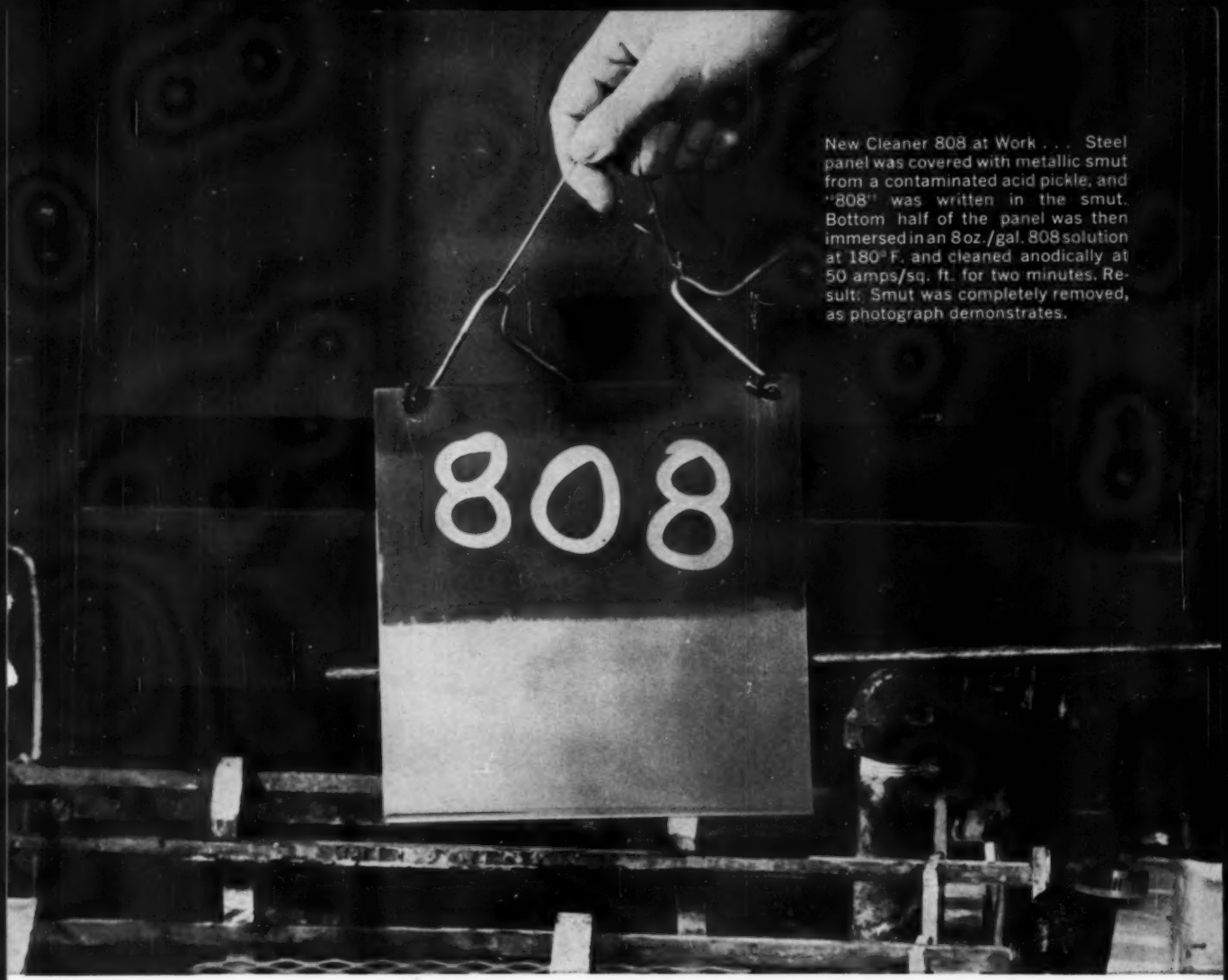

New Cleaner 808 at Work . . . Steel panel was covered with metallic smut from a contaminated acid pickle, and "808" was written in the smut. Bottom half of the panel was then immersed in an 8 oz./gal. 808 solution at 180° F. and cleaned anodically at 50 amps/sq. ft. for two minutes. Result: Smut was completely removed, as photograph demonstrates.

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Cleaner 808, a new development of Enthonics research, is an alkaline electro-cleaner with chelating action. Its selective chelating agents chemically encircle and remove smut, oxides, light scale and rust. Its high-detergency, high-conductivity ingredients complete the cleaning job. Result: Bright surfaces completely free of contamination.

Cleaner 808 is excellent for anodic cleaning of steel which has just enough rust or scale to defy conventional electro-cleaners. In most applications, by using the work as an anode at current densities of 50-75 amps/sq. ft., cleaning time is 1 to 5 minutes. Cleaner 808 also is being used cathodically. One such application: Cleaning used automobile bumpers for replating.

Cleaner 808 is a dustless, free-flowing alkaline powder with superior wetting, penetrating and dispersing characteristics, and water softening action. A low foam blanket minimizes spray and hydrogen gas explosion. Because oils are displaced and float to the surface, the cleaning solution is free of contamination, has long life.

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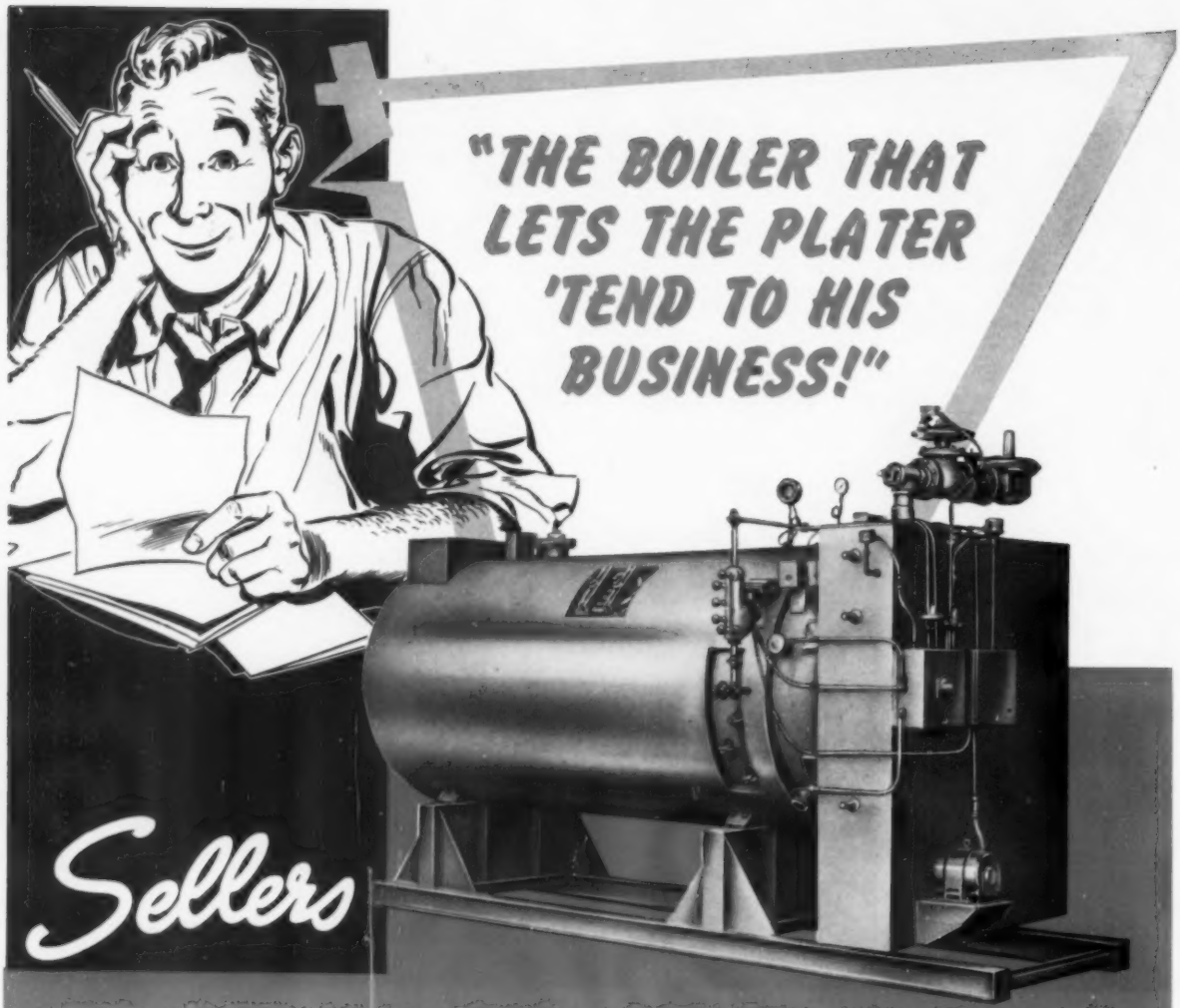

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JOURNAL OF THE AMERICAN ELECTROPLATERS' SOCIETY

MARCH 1961 — **Vol. 48, No. 3**

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EDITORIAL

RESPONSIBILITY AND THE DELEGATE

THE EXERCISE OF UTMOST CARE and selectivity, and the judicious manner by which Branch Delegates and Alternate Delegates to compose the Supreme Society, AES's summit governing council, are elected at Branch level is of moment not only to the membership and leadership of the Society but also to all of its 59 chartered Branches. Inasmuch as that governing body fashions the major policies of AES and enacts its laws governing all elements of the Society, including its Branches and Regional Groups and Councils, manifestly its component Delegates and Alternate Delegates must be the best qualified and informed members boasted by the Branches electing them.

In many Branches, the Branch Nominating Committee carefully chooses and proposes Delegates and Alternate Delegates meeting such standards as, for instance:

1. Dedication to the best interest of the Society and to its large role in stimulating advancements in electroplating, metal finishing and allied arts through education.
2. Determination to facilitate, by every practicable means consistent with sound policy, the continued development and prestige of AES so as to enable it to continue to function with utmost modern efficiency, to the benefit of its members, in today's world climate of change and challenge.
3. Knowledge of AES National, Regional and Branch government structure, and a working familiarity with parliamentary procedure, including Robert's Rules of Order.
4. Demonstrated qualifications of leadership, including proved willingness to keep abreast of National, Regional and Branch affairs by reading published data, by reasonably regular attendance at National and Regional meetings, and by a worthy record of regular attendance at Branch meetings.
5. Availability to attend scheduled meetings of the Supreme Society, and to participate fully and freely in its deliberations.

There are some Branch Nominating Committees, however, that select Delegates and Alternate Delegates who do not meet any of the foregoing specifications. This is undesirable. If the chosen Delegates and Alternates do not have suitable traits and attributes, plus a broad background on Supreme Society affairs, then they can hardly be expected to make prudent decisions in council. Conversely, immature judgments can obstruct, harass or even injure the Society's welfare and progress.

It stands to reason that Delegates and Alternates must maintain a stable record of attendance at Supreme Society meetings. Otherwise, when any or all of them fail to attend, the Branch loses its voice, in whole or in part, in the operation of the Society. This is particularly damaging if the Branch has specific constructive suggestions to offer furthering the aims of the Society. If the Branch cannot have its own elected representatives present, therefore, it should nevertheless exercise its franchise through the use of proxy, with or without instructions to its proxied Branch.

With Branch election time now fast nearing, it is every AES member's duty and responsibility to insist upon qualified Branch officers as well as Delegates and Alternate Delegates who most nearly meet the specifications listed above. Your Branch is entitled to the ablest possible representation by mature, objective-minded men. Your Supreme Society is equally entitled not only to participation in Supreme Society legislative deliberations of the full gamut of its chartered Branches, but also to the best-grade objective thinking and planning therein of each Branch's best equipped leaders.

Manuel Ben

Second Vice President
American Electroplaters' Society, Inc.

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Occupationally, they include corporate management executives or owners of individually owned plating and metal finishing establishments—plant executives, works managers, production managers, superintendents—metallurgists, chemists, engineers, consultants, testing laboratory specialists—purchasing agents—merchandising, marketing and sales executives and personnel—foremen and artisans, with each element performing an important team role in fortifying the earning and spending power of this important industry so vital to the public interest.

They reside from coast-to-coast and border-to-border in the United States and Canada, naturally with principal concentration in the East North Central, Middle Atlantic and New England States, densest focus areas of plating and metal finishing.

As members of half-century old American Electroplaters' Society, Inc. (AES) their annual subscriptions to AES's half-century old PLATING MAGAZINE are included in their AES annual dues. Moreover, a large and growing international number of AES non-members interested in educational enrichment, spontaneously subscribe yearly to PLATING, and renew their subscriptions year-after-year. It is revealing that not only does PLATING enjoy the largest audited PAID circulation in this field but also the highest audited percentage of PAID subscription renewals.

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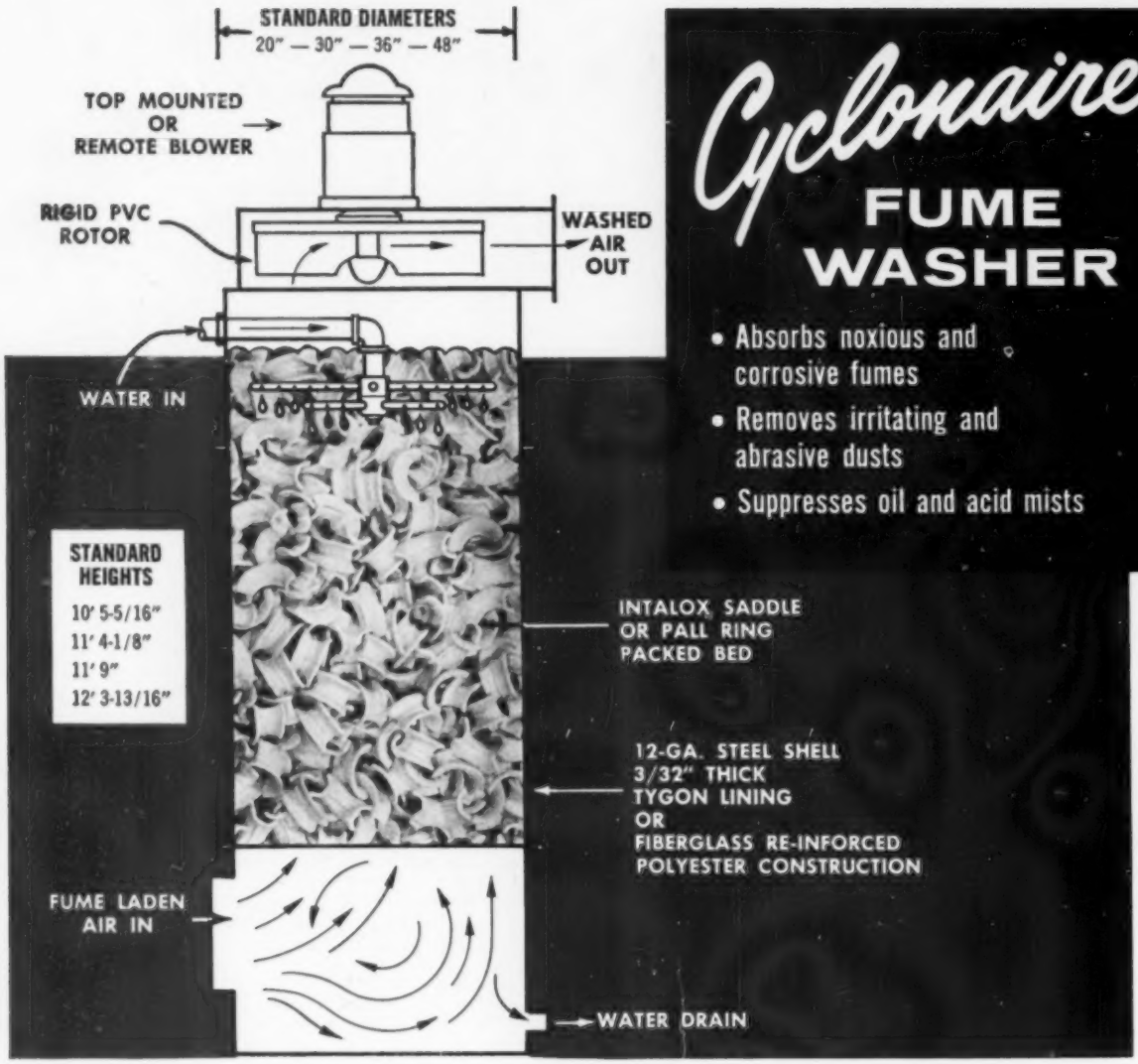

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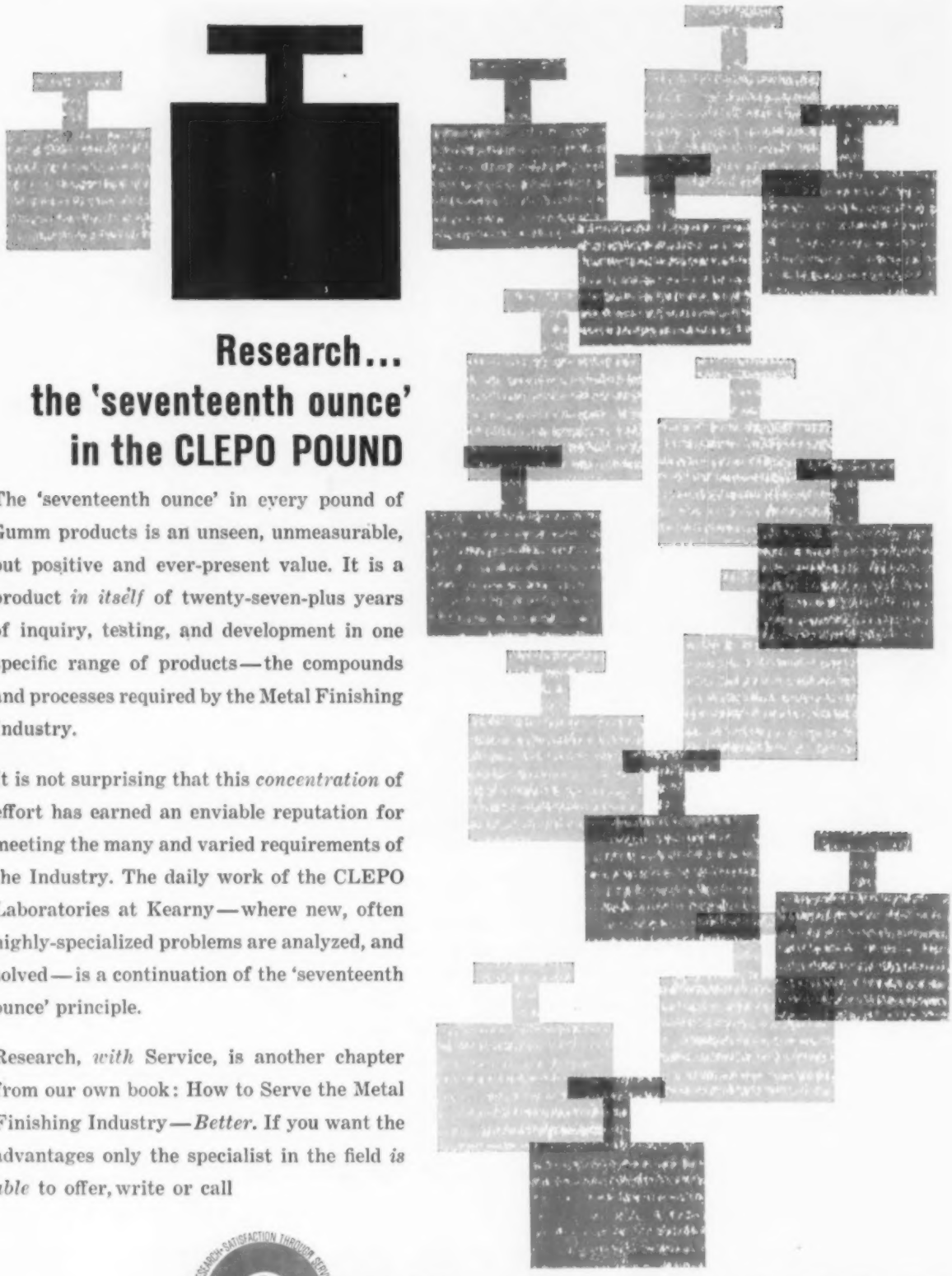

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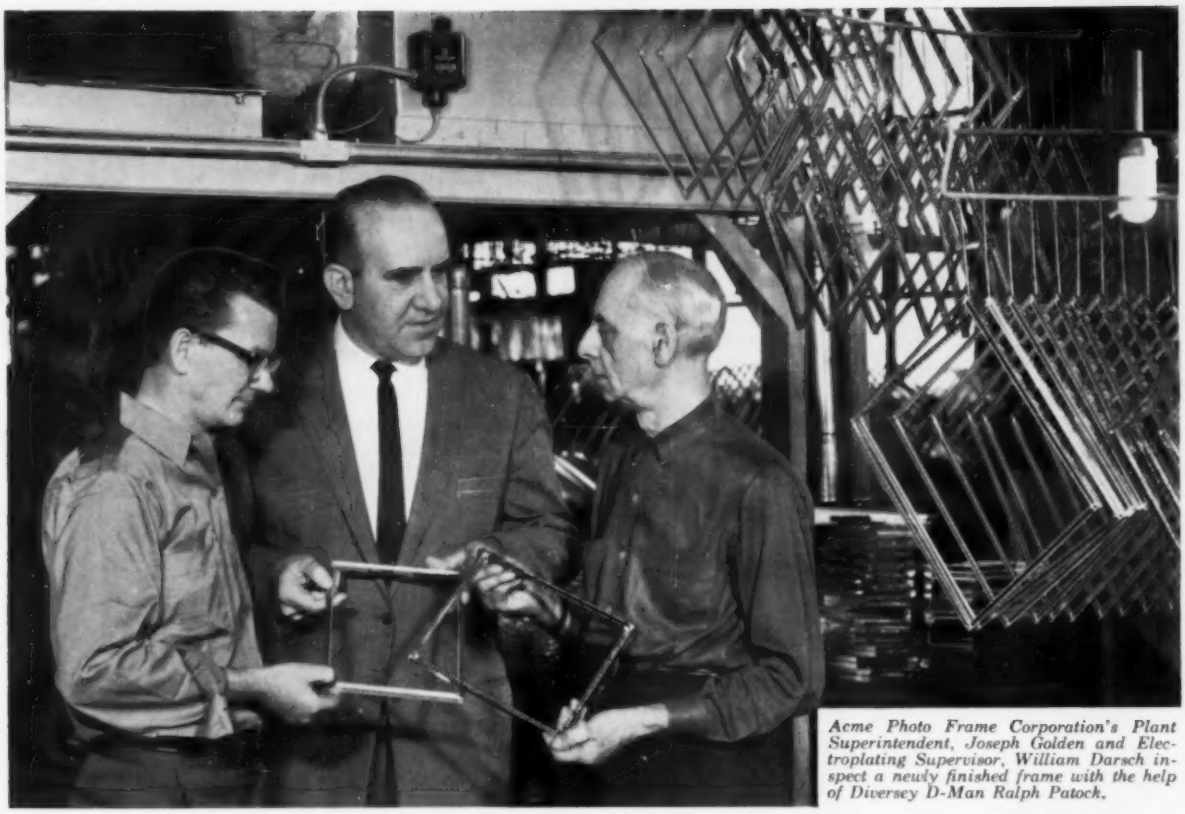

Acme Photo Frame Corporation's Plant Superintendent, Joseph Golden and Electroplating Supervisor, William Darsch inspect a newly finished frame with the help of Diversey D-Man Ralph Patock.

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eliminates smut problems... rapidly removes problem soils

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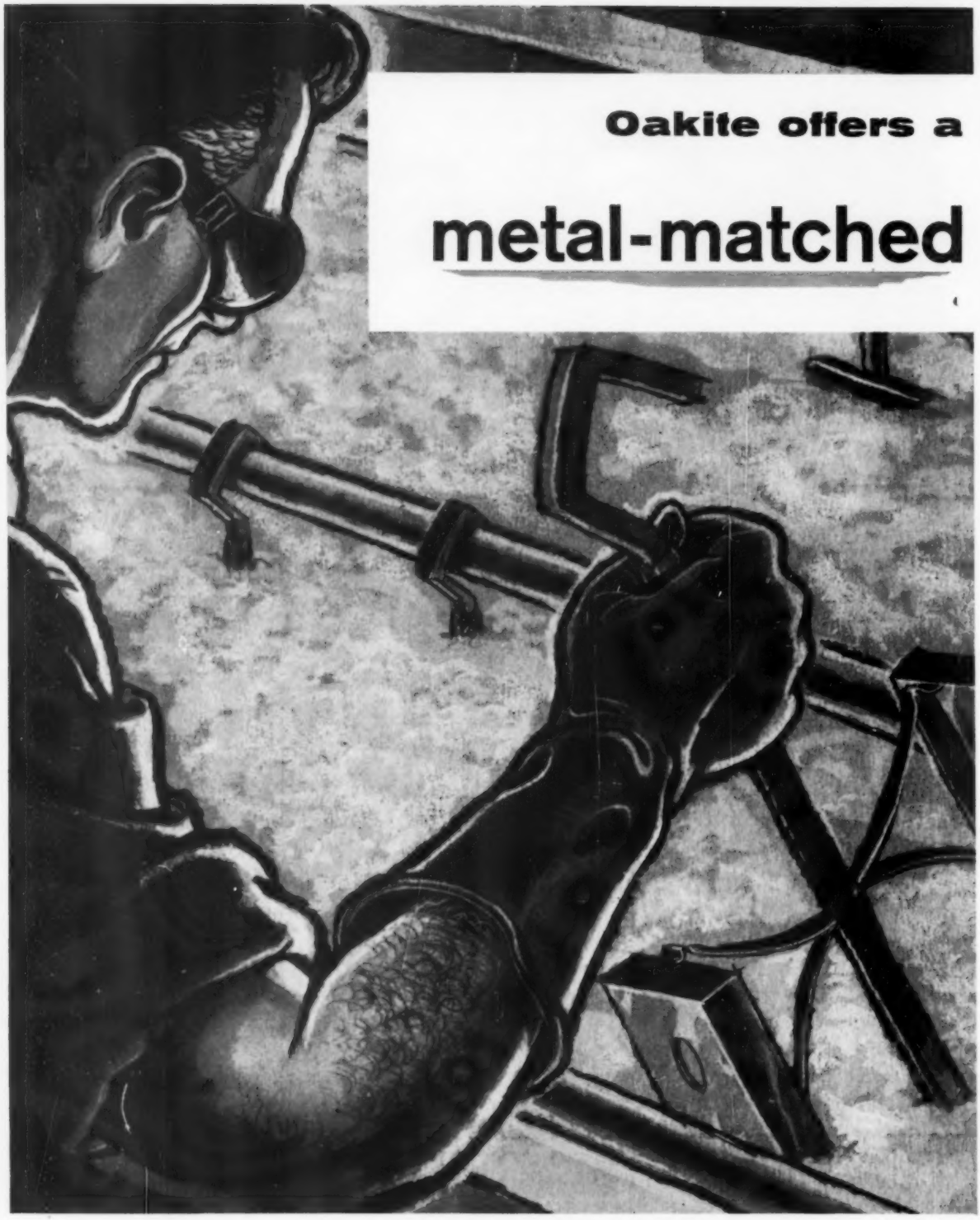

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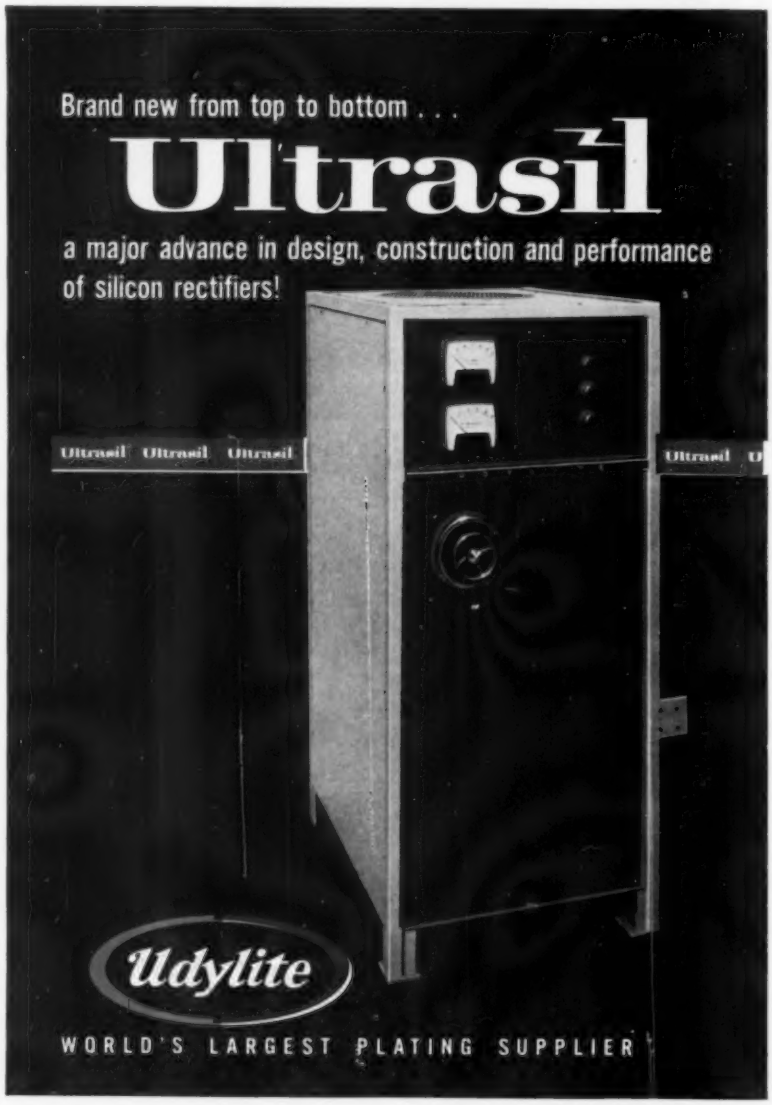
Harold E. Coombes Jr.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Plating Management, December 1960, pp. 10–12.

b. *FINISHING POINTERS—RHODIUM PLATING COSTS.*
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T. R. Thierry.
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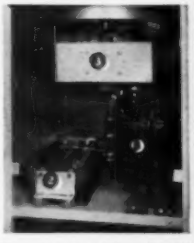

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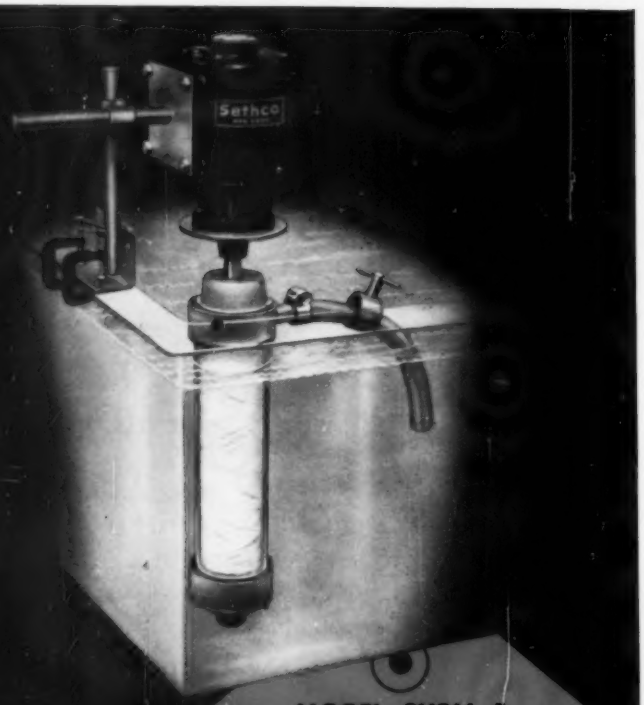

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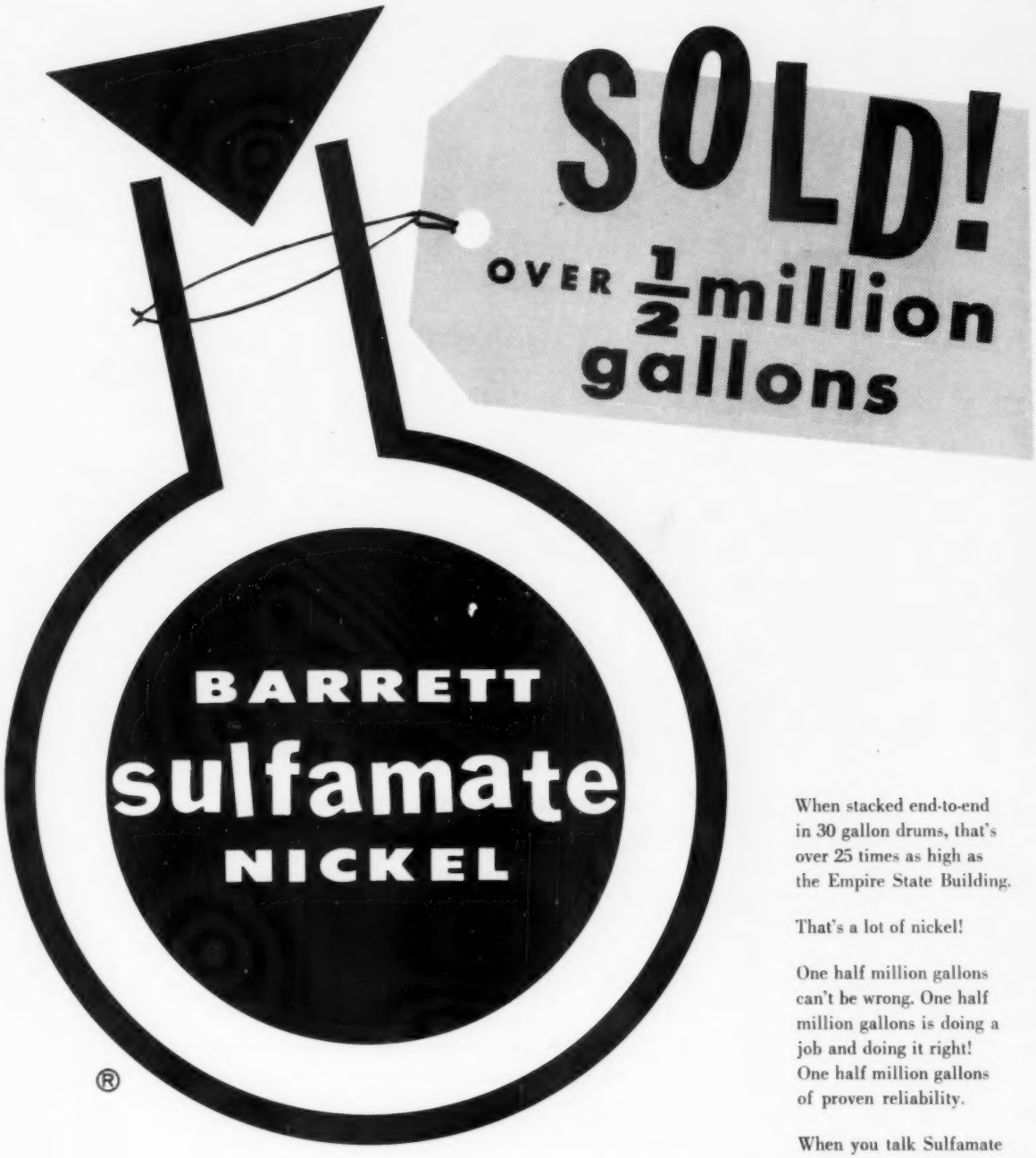

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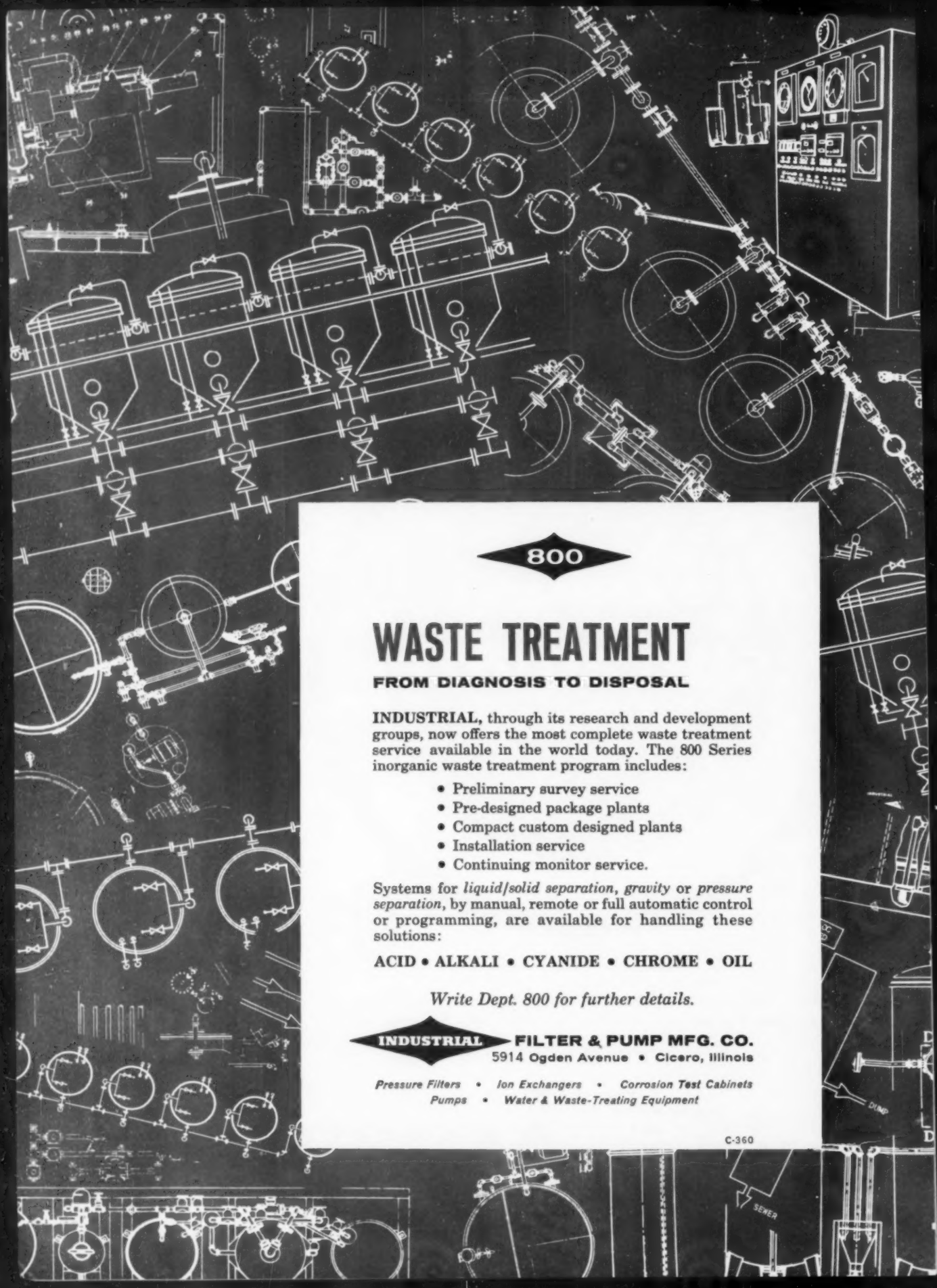

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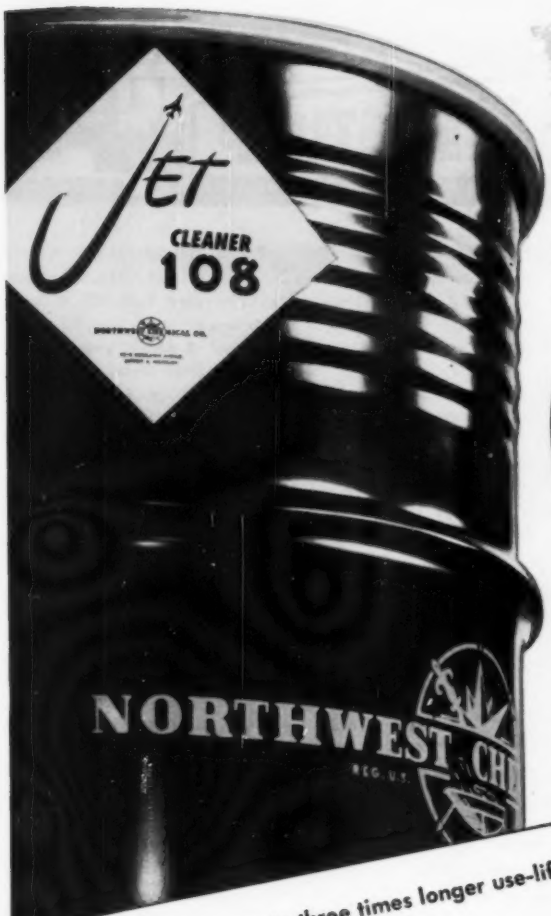

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TRADE LITERATURE

L—301. AUTOMATIC LOADING SYSTEMS—The Metal Finishing Division of Frederic B. Stevens, Inc., has just published a brochure devoted to automatic loading systems as they are used in conjunction with automatic barrel plating and processing equipment.

This profusely illustrated 12-page brochure contains case histories of a wide variety of automatic loading operations. It features detailed engineering drawings and on-the-job photographs of existing installations.

L—302. PROTECTIVE COATINGS—The solution to a wide variety of corrosion and deterioration problems is presented in the new Koppers 8-page bulletin No. T-97-61 on Bitumastic cold-applied protective coatings.

In addition to covering the properties and specification data on nine major Bitumastic products, the brochure lists scores of typical installations. The coatings, which are applied cold by brush, spray, and roller, are each designed to meet specific problems.

L—303. LABEL REMOVER—Clarco Bulletin No. 178 of the Clarkson Laboratories, Inc. describes Roll-Off, a new, thoroughly tested product used to assure complete removal of decals, paper labels, and lithographing from metal surfaces. It is non-flammable, easy to apply and economical. Its use before the metal is placed in a stripper tank eliminates need for buffing, scraping or burning to remove adhesive or ink.

L—304. ELECTROSTATIC PAINTING—Availability of a new 8-page, illustrated catalog describing centrifugal type electrostatic paint spray systems and equipment has been announced by Ionic Electrostatic Corporation. Bulletin 100 explains the limitations of conventional electrostatic spray equipment; then discusses the technique of atomization by air and centrifugal force, and the subsequent use of electrostatics to charge and guide pre-atomized particles of coating material.

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L—305. ULTRASONIC CLEANING SYSTEMS—A new bulletin describing Acoustica's 40-kc line of ultrasonic cleaning systems with a tank capacity range from 1¼ to 15 gallons is available from Acoustica Associates, Inc.

L—306. WATER TREATMENT FOR PAINT SPRAY BOOTHS—Simple directions for maintaining the efficiency of water wash paint spray booths are given in a new folder F9443 recently published by Oakite Products, Inc.

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(*Continued on page 309*)

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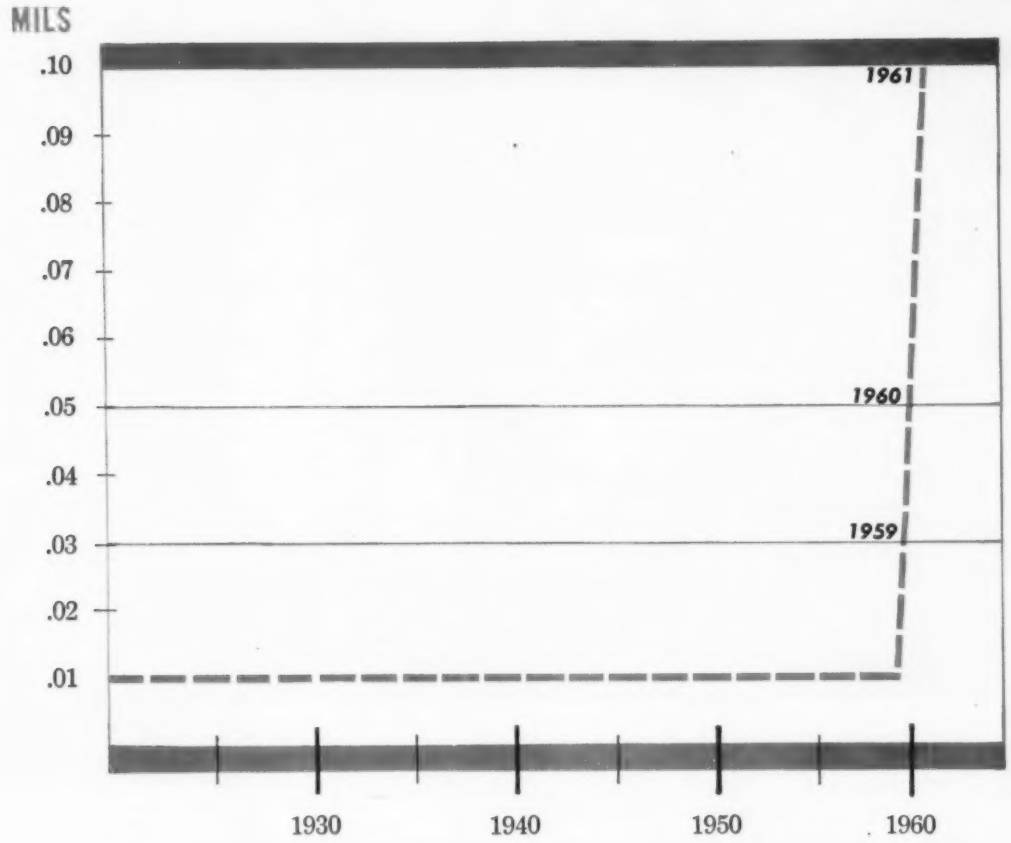

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Protective Coatings for Metals. 2nd edition by R. M. Burns and W. W. Bradley. 657 pages.	12.50	11.00
Analysis of Electroplating and Related Solutions—2nd edition, 1958..... by K. E. Langford. 423 pages.	9.00	7.50
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THE INTERNATIONALLY awaited 1960 Edition of the annual book, TECHNICAL PROCEEDINGS, of American Electroplaters' Society, Inc. (AES), published in record time, has now made its appearance, and copies thereof have already been issued to AES members in good standing far and wide, here and abroad, for whom the annual book is principally intended. And having accommodated its farflung membership with free copies, AES, the book's exclusive publisher, now has a limited quantity of extra copies available for sale to AES non-members, on strictly a "first come-first served" basis so long as that limited supply lasts, so as to share the book's educational benefits.

Comparable in quality to the GOLDEN JUBILEE EDITION of TECHNICAL PROCEEDINGS (1959 Edition) that earned worldwide acclamation in technical, scientific and other educational circles, AES's 1960 Edition, another treasure chest of knowledge on electroplating, metal finishing, organic coating and allied arts, contains the full text of each of the 31 papers delivered by experts before the 47th Annual Convention of American Electroplaters' Society, Inc., held in Los Angeles, California, July 24-28, 1960.

Embodying, too, the charts, diagrams, graphs, tables and other illustrations of each of the 31 published papers, the book also includes the transcript of the discussion that attended the delivery of each paper. A full list of the papers published in this voluminous repository of education appears on the opposite page of this announcement.

The unique book also includes, among other data, a day-to-day log of the Convention; a section on the AES Scientific Achievement Award and on other AES technical and scientific awards and honors bestowed at that first West Coast National AES Convention; a full listing of the Boards and Standing and Special Committees that served the AES during its fifty-first year, and a complete AES Branch Directory.

HOW TO ORDER YOUR COPY

A limited but fast dwindling extra quantity of the 1960 book has, as stated, been printed to meet the sizable interest shown in it by AES non-members internationally. Orders for copies of the book are now consequently invited from AES non-members, and will be accepted on strictly a "first come-first served" basis so long as that extra supply lasts. The book is unavailable for purchase elsewhere.

Within the continental limits of the United States, the domestic price of this 1960 Edition of AES's TECHNICAL PROCEEDINGS is $18 per copy including postage.

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As a dramatic and fitting climax of its 51st fiscal year, American Electroplaters' Society, Inc. (AES) conducted its outstanding 47th Annual Convention, first West of St. Louis, at the Statler-Hilton Hotel, Los Angeles, California, July 24-28, 1960, with the dynamic Los Angeles Branch, its West Coast pioneer, as Host Branch.

♦

The AES was welcomed to California and Los Angeles by Governor Edmund G. Brown and by Mayor Norris Poulson. The entire week of the AES's Convention was, in fact, proclaimed by Los Angeles's Mayor as "American Electroplaters' Society Week in Los Angeles."

♦

Educational Sessions numbered nine. Experts presented 31 technical and scientific papers enriching knowledge in electroplating, metal finishing and allied arts. One Session alone covered organic finishing.

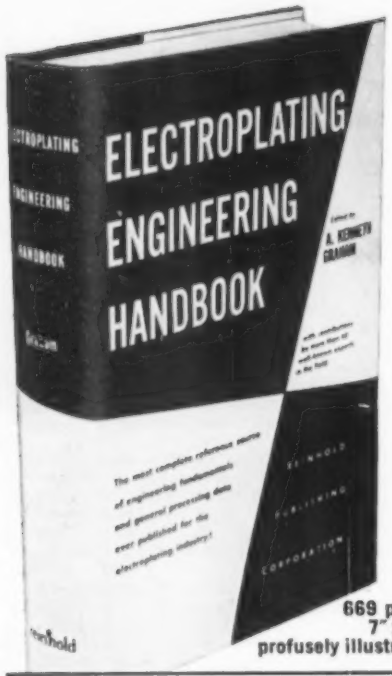
High spots of the Sessions were not only the second annual "William Blum Lecture" that was delivered as the Educational Program's lead-off attraction by Dr. A. Kenneth Graham, 1959 winner of the "AES Scientific Achievement Award", the Society's highest scientific honor, but also the vaunted two-session, eight-paper "Hydrogen Embrittlement in Metal Finishing Symposium." In addition, this Convention also featured the summary of AES Research Projects presented by AES Research Committee Chairman James D. Thomas at one of the Sessions.

♦

Under the active planning and supervision of the AES's Editorial Board itself, the Educational Sessions were programmed for the AES by Host Branch Educational Chairman Earl W. Arnold and his Co-Chairman, David F. Seymour, with Dr. Harold J. Read of Pennsylvania State University, a special member of that Los Angeles Branch Committee, responsible for the "Hydrogen Embrittlement in Metal Finishing Symposium."

OPENING EDUCATIONAL SESSION HEARS 1960 "WILLIAM BLUM LECTURE"

(1) Dr. William Blum introducing Dr. A. Kenneth Graham, deliverer of the 1960 "William Blum Lecture." (2) Attentive audience hears Dr. Graham discuss "Faraday's Laws Applied to Cleaning." (3) Dr. Graham holds "AES Scientific Achievement Award" scroll presented to him by National President Ralph D. Wysong, right, in behalf of American Electroplaters' Society, Inc.



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The unique book contains the full text of each of the 43 technical papers on electroplating, metal finishing, organic coating and allied arts by experts of nine countries, including the United States, England, Canada, Australia, France, Germany, Holland, India and Italy, delivered before the Fifth International Conference on Electrodeposition and Metal Finishing, educational sessions element of the AES's Golden Jubilee Convention held in Detroit, Michigan, June 15–19, 1959.

Embodying, too, the charts, diagrams graphs, tables and other illustrations of each of the 43 published papers, *the book also includes the transcript of the discussion that attended the delivery of each paper.* A full list of the papers published in this voluminous treasure chest of knowledge has been carried in past issues of PLATING MAGAZINE since December 1959, and will gladly be sent to you on request.

Spanning some 400 pages (by far the largest annual TECHNICAL PROCEEDINGS ever published by the AES in its half-century lifetime), this 1959 edition also includes, among other data, a day-to-day log of the Golden Jubilee Convention; a section on the AES Scientific Achievement Award and on other AES technical and scientific awards and honors bestowed at the Golden Jubilee Convention; a full listing of the Boards and Standing and Special Committees that served the AES during its Fiftieth Anniversary year, and a complete AES Branch Directory.

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INTERNATIONAL CONFERENCE: ITS AES HALF-CENTURY SETTING

DRAMATIC and fitting climax of its year-long FIFTIETH ANNIVERSARY observance, American Electroplaters' Society, Inc. (AES) conducted its unique Golden Jubilee Convention and Industrial Finishing Exposition, including the concurrent Fifth International Conference on Electrodeposition and Metal Finishing, in Detroit, Michigan, June 15-19, 1959.

GREETED by the President of the United States, the AES was welcomed to Michigan and Detroit by Governor G. Mennen Williams. The entire week of the AES's Convention, Exposition and International Conference was proclaimed by Detroit's Mayor as "AES GOLDEN JUBILEE WEEK IN DETROIT."

AS the Fifth International Conference on Electrodeposition and Metal Finishing, the Golden Jubilee Convention's educational sessions numbered eleven. Experts from nine countries, including the United States, England, Canada, Australia, France, Germany, Holland, India and Italy, presented 43 technical and scientific papers enriching knowledge in electroplating, metal finishing and allied arts. High spot of the sessions was the first "William Blum Lecture" that was delivered by the eminent Dr. William Blum, first winner of the AES Scientific Achievement Award, the Society's highest honor.

UNDER the supervision of the AES's Editorial Board, in collaboration with the International Council on Electrodeposition and Metal Finishing, the International Conference was planned for the AES by AES Past President Walter L. Pinner, Chairman of the International Council. His Committee included Dr. T. P. Hoar, Dr. Simon Wernick, A. W. Wallbank, R. A. F. Hammond and George Gardam of England and Myron B. Diggin, Dr. Walter R. Meyer and Dr. Richard B. Saltonstall of the United States.

OPENING SESSION OF THE FIFTH INTERNATIONAL CONFERENCE ON ELECTRODEPOSITION AND METAL FINISHING

(1) Chairman Walter L. Pinner extending official welcome. Dr. William Blum, AES Scientific Award winner, seated. (2) Crowded auditorium at the first session. (3) Session Chairman T. P. Hoar introducing Dr. Blum, who delivered the first William Blum Lecture.

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CONTENTS: Introduction; Deposition of Metallic Coatings by Chemical Reduction; Vacuum Metallizing (Metal Evaporation); Cathode-Sputtering Process; Silver-Spray Method; Electrodeposition; Miscellaneous Metallizing Methods; Characteristics and Testing of Metallic Deposits on Plastics; Recent Developments and Future Potential Uses for Metallized Plastics; Bibliography; Index.

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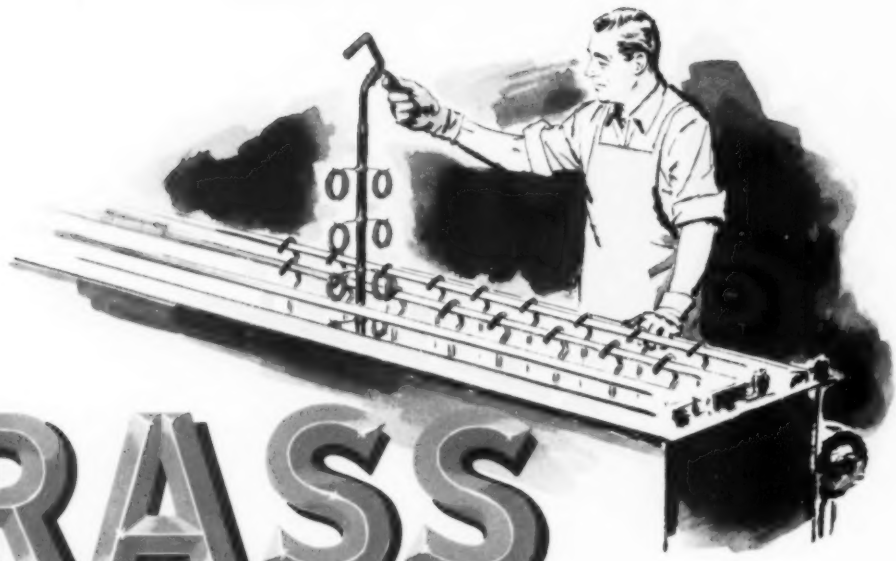

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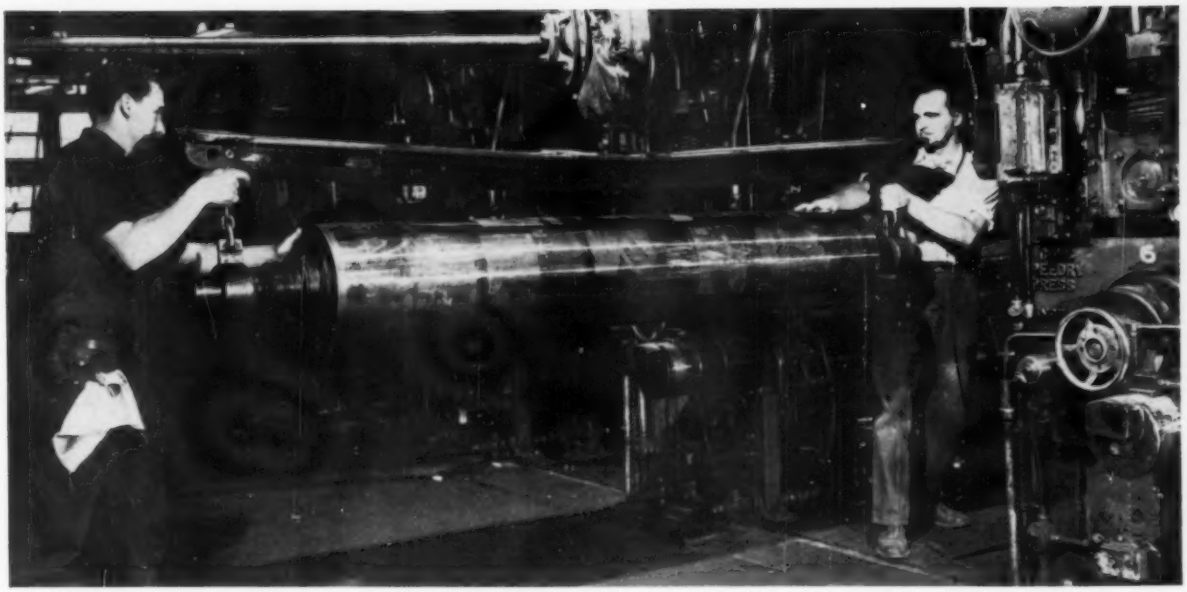

Fig. 1. An etched chromium plated printing roll being placed in the printing press.

SPECIFICATIONS AND PHYSICAL TESTS FOR COPPER PLATING ROTOGRAVURE ROLLS

by HAROLD T. WILSON*

ELECTROPLATING plays an important part in the rotogravure printing process. To a point it is a specialized process of plating rolls or cylinders, therefore its requirements are somewhat specialized.

Rotogravure printing is an intaglio process, that is the design to be printed is below the surface. The design is made up of a number of square cells and variations of tone are effected by differences in the depth of the ink filled cells in the printing roll. Figure 1 shows etched cylinder ready for the press.

Ink is applied to the surface of the roll in the printing press thus filling the etched cells. The residue ink is removed from the surface of the roll by a reciprocating steel blade called a Doctor Blade. When the paper comes in contact with the roll only the ink filled cells print an impression. (Fig. 2)

PLATING REQUIREMENTS

a) The plating must be able to withstand the very abrasive qualities of paper and ink, both of which contain high percentages of china clay, for long and fast printing runs (16,000 magazines per hour and total runs of 1,000,000 up).

b) The plated surface must be of such a smooth finish that it has no printing quality.

c) An error of 0.0035 per cent in concentricity or in diame-

* Plating Foreman, Montreal Standard Publishing Company, Town of Mount Royal, Quebec, Canada.

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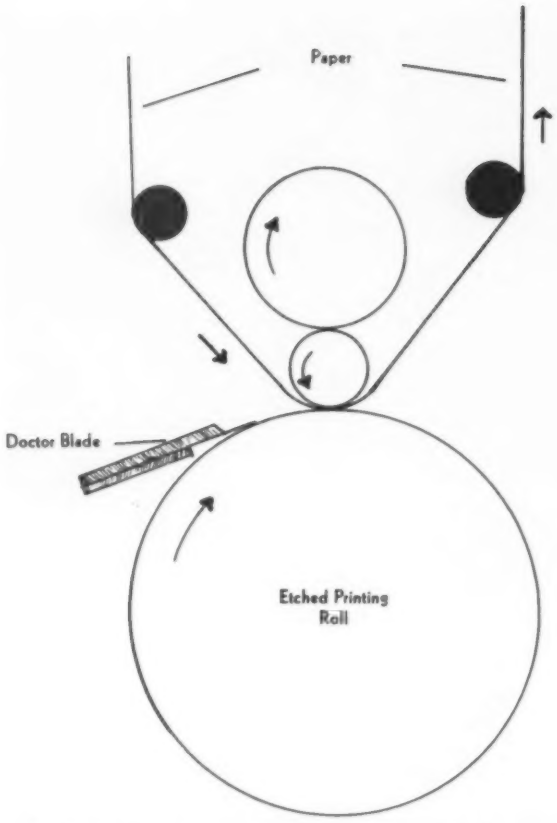
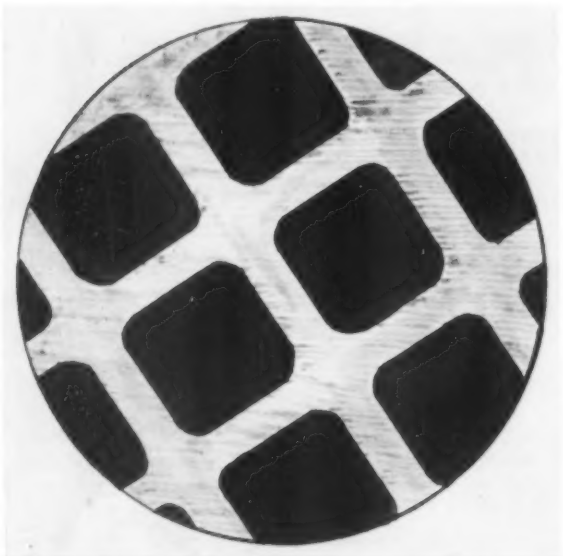
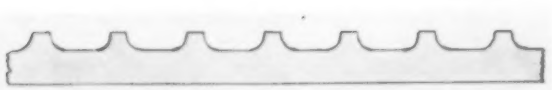


Fig. 2. Schematic showing doctor blade, printing roll and paper.



Gravure cells and cell walls. Ratio of cell to cell wall is approximately 3½:1.



Section of etched copper shell showing cells and cell walls.

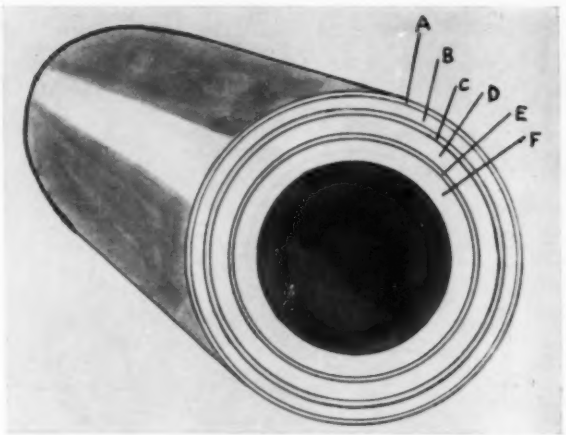


Fig. 3. Diagram of cylinder showing various layers of plated metal.

A—Chromium 0.0002 inches
B—Acid copper shell 0.005 inches
C—Chemically treated surface
D—Base acid copper 0.030 inches
E—Cyanide copper or nickel
F—Steel base 0.625 to 0.75 inches

ter of the roll is sufficient to cause a great deal of trouble on the printing press.

d) Hardness of the plated metal is obviously of importance, too soft a metal and the etched cell structure, of which the illustrations and type matter are composed, collapses. Too brittle and the cell walls break off.

There are four electroplated metal coatings to be tested.

1. Cyanide copper or nickel.
2. Acid copper. (Base copper)
3. Acid copper. (Ballard shell)
4. Chromium.

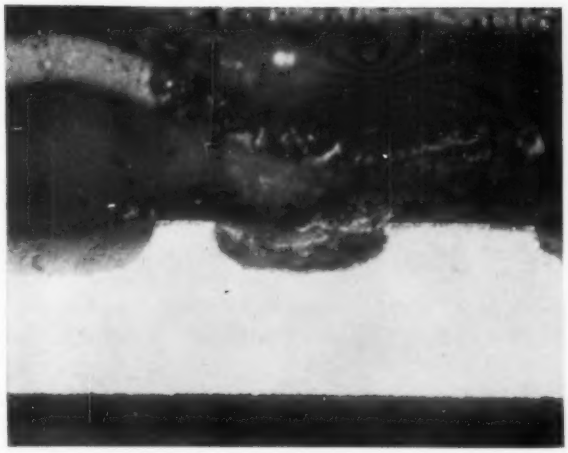
The rolls are chromium plated after type matter and illustrations have been etched and all corrections made. The object of the chromium plating is to increase the life of the printing roll, it has the effect of sealing down the desired result and preventing deterioration of printed copy during the press run.

A brief description of the printing roll will perhaps be beneficial. It is a hollow steel tube into each end of which is fitted a steel trunnion, thereby enabling each roll to have its own bearing surface. In the larger rolls strengthening ribs are incorporated. A diagram of the cylinder showing various layers of plated metal is given in Fig. 3.

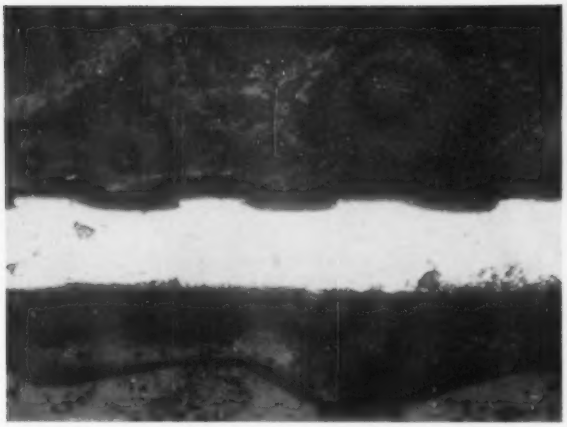
PROCEDURE

The steel base is first plated with cyanide copper or nickel, and then plated with 0.030 inch of acid copper. This acid copper (base copper) is ground and polished accurately to a given size and the surface is then chemically treated to ensure that the 0.005 inch acid copper shell which is plated on this can be stripped off after the printing run is completed. It is of interest to note that the shell must adhere well enough to the base so that it does not blister during the printing run or as a result of any hand work done on the illustrations or type matter.

After the illustrations and type matter are etched into the shell surface and everyone is satisfied with the result, the roll



Photomicrograph of an unworn cell, even after it had run on the press for a million-plus impressions. Original magnification 230X.



Photomicrograph of a badly worn cell. Note the increase in size of the bridge where the copper has been squashed down into the cell. Original magnification 115X.

is chromium plated. Thickness of chromium varies in different plants but 0.0002 inches is a popular thickness.

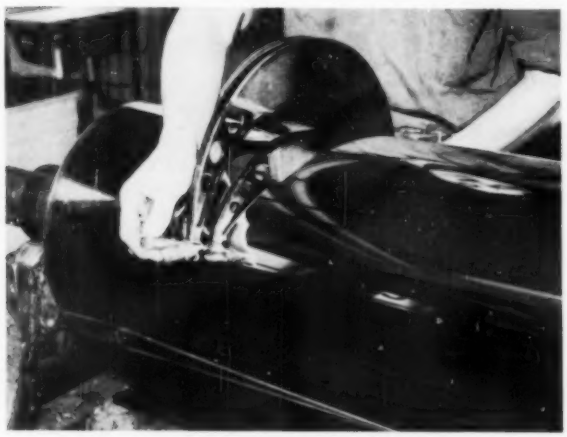


Fig. 4. Testing with hand micrometer.

Fig. 5. Micrometer dial gage test.

TESTS

The ferroxyl test is applied to cyanide copper or nickel, either of which is plated directly on to the steel base. This particular test is a test of porosity and is only qualitative, the object being to distinguish between good and poor coatings.

There are several formulas for the ferroxyl solution, some use a high concentration of sodium or potasium ferricyanide and a low concentration of sodium chloride, others a mixture of ferricyanide and ferrocyanide and sodium chloride. With either formula the solution is usually absorbed in paper which is stored dry and moistened before application to the surface to be tested.[1]

Blue spots indicate that the coating is porous, several papers are tried on each roll, each plant will have its own standard.

The ground and polished base and the finished roll ready for the etching process are tested for size (diameter) with hand micrometers (Fig. 4) or micrometer dial gages (Figs. 5 and 6) which are graduated in 0.0001 of an inch.

The micrometer gives the actual diameter of the roll, where

Fig. 6. Arc type micrometer measuring gage for testing size of rotogravure printing rolls.

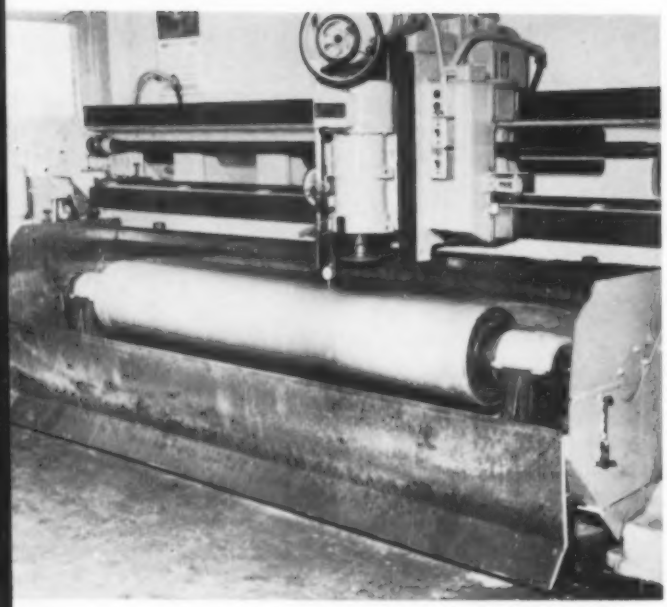


Fig. 7. Grinding machine, roll and dial indicator.

as the micrometer gage measures either the actual diameter or an arc of the printing roll, in either case the gage is set or zeroed on a master ring prior to measuring the roll and the difference is recorded on the dial indicator in 0.0001 of an inch.

To test for concentricity the printing roll is rotated slowly in fixed bearings against a fixed dial indicator (Figs. 7 and 8) which is graduated in 0.0001 of an inch, any error is recorded on the dial indicator. On a printing roll 80 inches in length, five or six equally spaced readings would be taken for diameter or concentricity.

Fig. 8. Close view of the roll and dial indicator.

Chromium Thickness Test

Thickness of chromium is measured by dissolving a spot of the chromium and measuring with a microscope. The microscope (Fig. 9) has a special base to enable it to be placed directly onto the surface of the printing roll. The copper and chromium surfaces are each accurately focussed and the difference in 0.0001 of an inch is the thickness of chromium plate.

Chromium thickness is further tested by mounting a section of chromium plated shell in a metallograph microscope, a magnified picture of the shell section is reflected on a screen and copper and chromium thickness can be measured.

As is obvious with such a low percentage of error permissible, measurements of diameter must be made at a constant temperature.

All rolls are measured at 70F and to ensure that the temperature of the roll is accurate a special pyrometer (Fig. 10) is used.

As has been said the final acid copper coating, 0.005 or in some plants 0.006 of an inch in thickness, is stripped off the base copper after the printing run is completed, it is therefore easy to carry out various tests for hardness and tensile strength.

In the early days of gravure printing the roll was made of copper tube about one-half inch in thickness, thus Brinell readings could be taken of the copper hardness. Today this type of roll has been superseded by the type previously described.

Copper Hardness Test

Thin specimens of copper are difficult to test for hardness because of the effect of the underlying metal, therefore the

Fig. 9. The special base on the micrometer enables it to be placed directly onto the surface of the printing roll.

usual method is to test the edge of a mounted specimen of the copper shell by means of a diamond point instrument.

One method of doing this is to mount the specimen to be tested in a plastic mold and polish the edge down to a flat fine finish. (Fig. 11.) The specimen can then be placed in a micro-hardness testing instrument and the diamond point hardness taken.

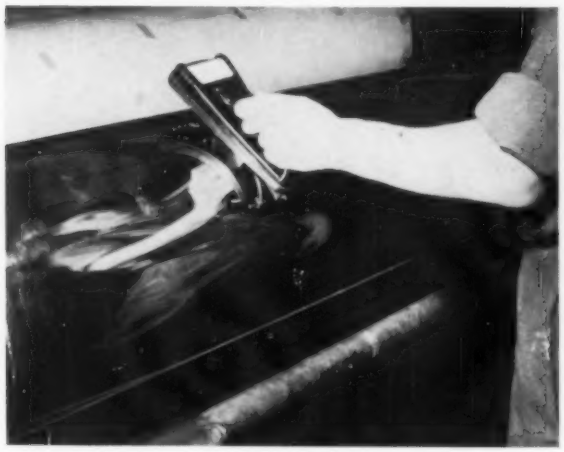


Fig. 10. Pyrometer is used to determine the temperature of the roll.

Formula (Vickers)

$$\text{Diamond point hardness} = 1\,854 \times \frac{\text{Load in kilograms}}{\text{Length of diagonals in mm squared.}}$$

Average good hardness—90 to 120 diamond point hardness.
Average Hard (Possibly brittle)—135 to 155 diamond point hardness.

Soft . . . . . Below 75 diamond point hardness.[2]

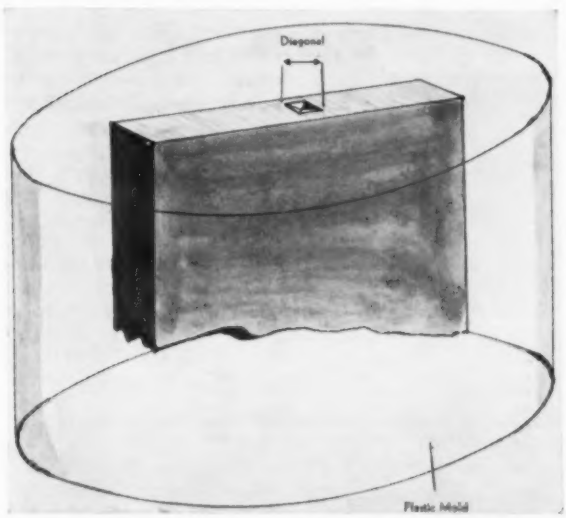


Fig. 11. Specimen of copper shell with diamond indentation.

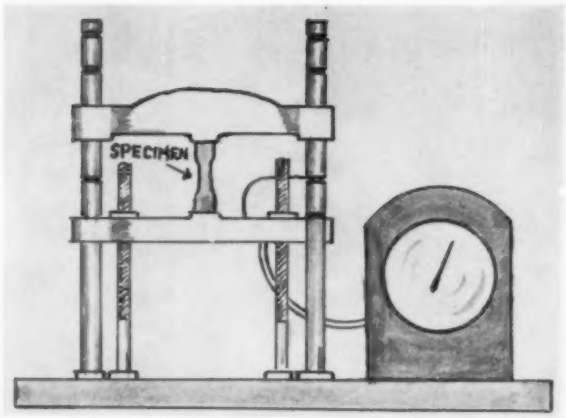


Fig. 12. Hydraulic testing machine.

Tensile Strength and Ductility Tests

The Southwark-Heydenkampf hydraulic testing machine is one of several that has been adapted to testing rotogravure shells. The instrument (Fig. 12) consists of two movable jaws that grip the specimen by its ends. The jaws move apart at a constant rate until the specimen breaks and the

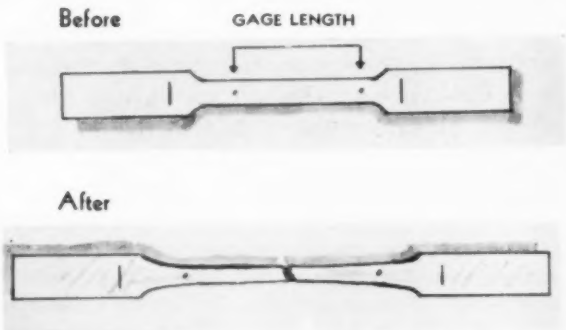


Fig. 13. Standard tensile test specimen, before and after breaking. Note increase in gage length after specimen is broken.

load or force at this point is recorded by a gage mounted on the instrument. A computation based on dividing the load by the cross sectional area of the specimen gives the tensile strength of the copper.

The same instrument used for tensile strength tests is used for elongation or ductility tests. Two marks are placed on the specimen two inches apart and after a specimen is broken by the tester it is carefully put together again. The distance between the two marks is then measured. Usually an increase in the distance occurs because the ductility of the metal allows a specific amount of stretching before breaking. (See Fig. 13)

Average good strength copper—39,000 to 45,000 lb/sq in.
Poor strength copper—Below 35,000 lb/sq in.
Average Ductility—20 to 30 per cent in 2 inches.
Very ductile—35 to 50 per cent in 2 inches.
Brittle—0 to 5 per cent in 2 inches.[3]

A simple method of testing ductility is by the bend test. A section of the copper shell is bent over upon itself through an

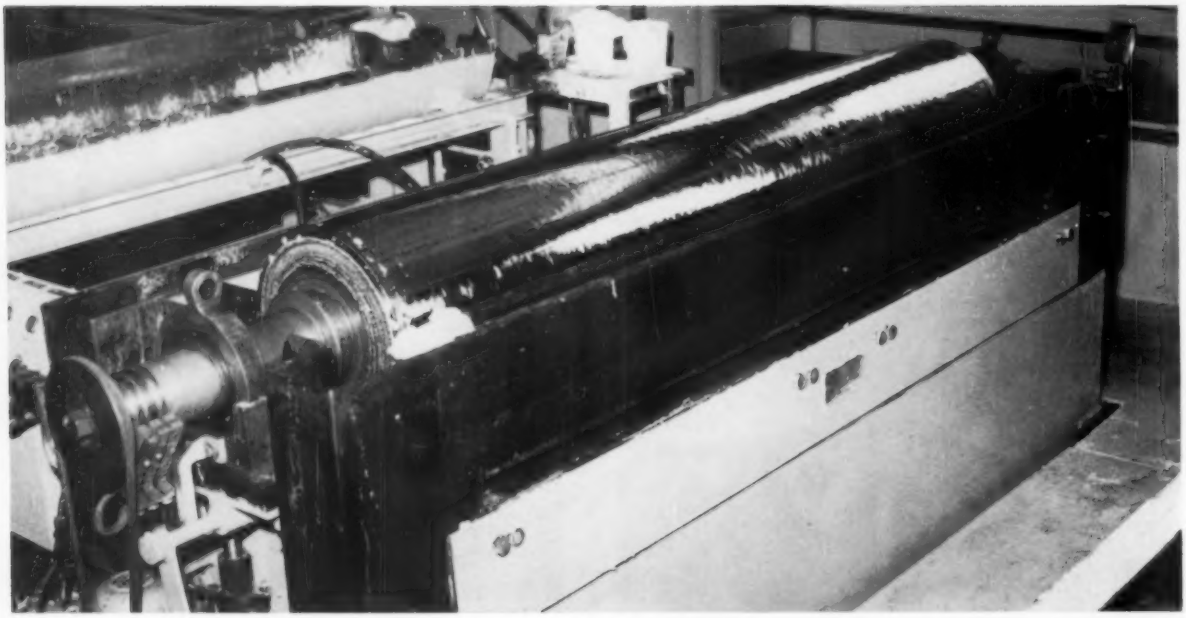


Fig 14. Mettenheimer bright copper plating tank.

angle of 180 degrees. The specimen is required to stand the bending without fracturing on the outside of the bend.

SMOOTHNESS OF FINISH

Smoothness of the finished copper is of great importance but will vary from plant to plant, the finished copper must not have any printing value.

In plants where there is no bright copper plating process and mechanical polishing is performed after plating, a smoothness of 2.5 to 3.5 microinch-finish is good, above 3.5 may print out.

With one particular bright copper plating process used in the rotogravure industry, a smoothness of between 1 to 2 microinches is obtained.

The smoothness of the finished roll can be measured by a surface comparator.

Grain structure of the copper is important and photomicrographs are taken. In general a fine grain deposit will be smoother, harder, stronger and less ductile than a coarse-grain deposit.

The hardness, tensile strength, ductility, smoothness tests, and photomicrographs are usually conducted in a laboratory and not in the plant.

All in all perhaps the most satisfactory test is that a set of printing rolls go to the press and complete the run without showing signs of wear—and in record time.

ACKNOWLEDGMENTS

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[2]Technical Guide for the Gravure Industry, Gravure Technical Assoc., Inc., Chap. 7, p. 3.

[3]Technical Guide for the Gravure Industry, Gravure Technical Assoc., Inc., Chap. 7, p. 8.

Harold T. Wilson was born at Bristol, England in 1913. He studied chemistry at the Merchant Venturers College, Bristol. He began his association with plating in the rotogravure industry at the Vandyck Printers of Bristol and in 1935 went to Odhams (Watford) Ltd., as foreman plater. He stayed there until 1949 excepting for war service with the British Navy. In 1949 he went to The Montreal Standard Publishing Company as foreman of plating. He has been a member of the AES Montreal Branch since 1952.

POLAROGRAPHIC METHODS FOR THE ANALYSIS OF ACID GOLD ALLOY PLATING SOLUTIONS

by ARNOLD H. CRAFT and KARL SCHUMPELT*

ABSTRACT

In recent years a great number of gold alloy plating solutions have found wide applications, particularly in the electric and electronic industries which contain besides organic sequestering agents, small amounts of certain base metals. The control of such electrolytes by classical analytical methods was found to be time-consuming and in some cases not too accurate. The polarographic method described in this paper resulted in considerable time saving and greater accuracy.

THE TECHNOLOGICAL ADVANCES in the electronic and communication fields during the past decade with the increasing use of precious metal deposits have led to entirely new concepts in the formulation of electrolytes. The conventional cyanide gold plating solutions of a *p*H above 7.0, which have been in use for almost a century and which had been quite satisfactory for decorative and protective coatings, could no longer satisfy the demands of the space and atomic age. The manufacturer of semiconductors, transistors and connectors specify for gold deposits certain properties which are difficult to obtain from high *p*H and hot electrolytes of the cyanide type. The latter are also unsuitable for printed circuits due to their attack on the photoresists and adhesives.

These demands could be met only by radical deviations from the old formulas. Other metals had to be incorporated in the gold deposit to increase hardness, and organic compounds were introduced in the electrolytes partly to facilitate this codeposition, partly to act as brighteners.

Since the prime contractors for electronic components imposed strict specifications, the control of the electrolytes assumed even greater importance. In some instances the classical analytical methods were very time-consuming and lacking in accuracy.

It is the purpose of this paper to describe a polarographic procedure for special acid-type gold plating solutions which are now in wide use and which contain, besides gold, one or more of the following metals: cobalt, nickel and indium.

Generally, the gold is separated from the base metals by fuming with concentrated sulfuric acid. This will at the same time destroy any organic compounds and convert the base metals into soluble sulfates. An oxidizing agent may be added to speed up this process if it does not interfere with later steps which in some cases it does. Since the polarographic method is very sensitive for even small amounts of base metals, a small sample of 2 ml is sufficient and will also reduce the time required for the fuming with sulfuric acid.

An automatic recording polarograph is highly desirable and the analyst should be thoroughly familiar with the principles of polarography.

ANALYSIS PROCEDURE

Following is a step-by-step description of the procedure for analyzing an acid-type gold plating solution for gold, nickel, cobalt and/or indium:

1) A 2 ml sample is pipetted into a 50 ml Erlenmeyer flask and after the addition of 1 ml of concentrated sulfuric acid is heated on a hot plate to heavy white fumes. A few drops of nitric acid may be added to speed the destruction of organics.

2) After cooling and addition of some distilled water, the gold is filtered, washed, ignited in a tared porcelain crucible and weighed.

3) The filtrate contains nickel and cobalt and is placed in a 50 ml volumetric flask which should contain 20 ml of the supporting electrolyte† and 15 drops of a 0.2 per cent solution of Triton** as maximum suppressor. The flask is then filled to the mark with distilled water. (In case indium is present, follow step 6.)

4) The contents of this flask are transferred to the polarographic cell and water saturated nitrogen is bubbled through the solution for exactly five minutes, (by timer) and then played over the surface for the whole run in order to keep out oxygen.

5) After setting a current range commensurate with the metal concentration and starting the dropping mercury electrode, well defined waves for nickel and cobalt will be recorded on the instrument. The nickel[1] wave appears at 1.08 volt (negative) and is followed by the cobalt[2] wave at 1.3 volt (negative) as shown in Fig. 2. The vertical distances between the waves and the baseline represent the microamperes which can be translated into concentration in grams per liter using the calibration graphs (Fig. 3).

6) If indium is present in the sample, it is precipitated with ammonia as hydroxide after the fuming described in step 2 and is filtered together with the gold. Since the indium hydroxide is slightly soluble in excess ammonia, it is necessary to add to the liquid a few drops of Brom-

Fig. 1. Electro chemograph of Leeds & Northrup

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† The supporting electrolyte consists of 325 ml ammonia and 267.5 g of ammonium chloride dissolved in 2 liters of distilled water.

** Rohm & Haas, Philadelphia.

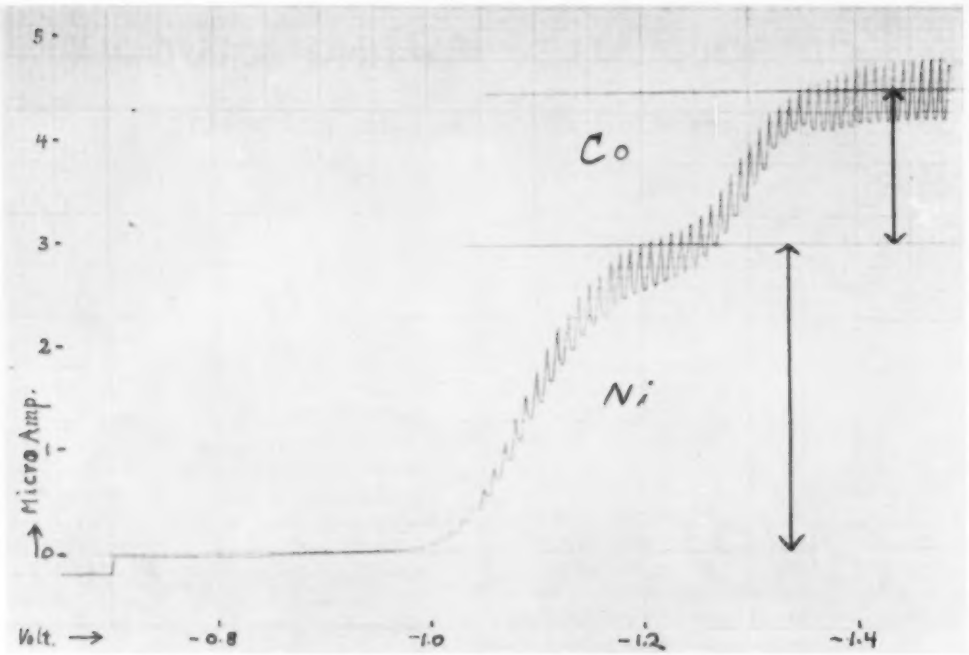

Fig. 2. Polarogram of sample containing nickel and cobalt

thymol Blue indicator and to drop from an eyedropper ammonia until the color change from yellow to blue occurs. At this point the precipitation of indium will be complete.

6A) The filtrate from gold and indium hydroxide containing the nickel and/or cobalt is processed as described under 4) and 5).

6B) The indium hydroxide is now dissolved on the filter with 8.5 ml of 1:1 hydrochloric acid and washed several times with distilled water directly into a 50 ml volumetric flask. The gold and filter are ignited in a tared porcelain crucible and weighed.

If, after the addition of five drops of 0.2 per cent Triton solution, the flask is filled to the mark with distilled water, the electrolyte will then be one molar in hydrochloric acid.

6C) The polarogram is obtained in the same manner as for nickel and cobalt and a well defined wave appears at 0.65 volt (negative).

In order to derive the greatest benefit from this instrumental method, it pays to prepare the calibration graphs for the three metals in question by running a large number of solutions of exactly known metal concentration and plotting the microamperes of the resulting waves against the concentration in grams per liter. If these standard solutions are prepared with greatest care and accuracy, all the points of the plot will fall on a straight line. (Fig. 3)

For those who wish to make only an occasional analysis, the so-called "standard addition" method can be used as an alternative. The sample of the unknown is run first in the usual manner and a wave obtained. Then an exactly known quantity of the same metal is added and a new wave is recorded which is higher than the first one.

The addition of the "standard addition" increases, of course, the volume and this must now be reduced by evaporation to the original one or the concentrations must be recalculated for the increased volume. Considering the possibility of errors in the execution of this method and in the

TABLE I
COMPARISON OF RESULTS BY POLAROGRAPHIC AND STANDARD ANALYTICAL METHODS

	Polarograph Method			Standard Method		
Sample	Co g/l	Ni g/l	In g/l	Co g/l	Ni g/l	In g/l
4240	0.44			0.56		
4408	0.79			0.55		
4409		1.7			1.05	
4411		1.4			1.5	
4412	1.4			1.58		
4420	2.53		3.52	2.56		4.05
				Co + Ni g/l		
4424	1.5	2.65	4.9	4.4		4.65
4425	1.1	2.32	2.68	3.70		3.44

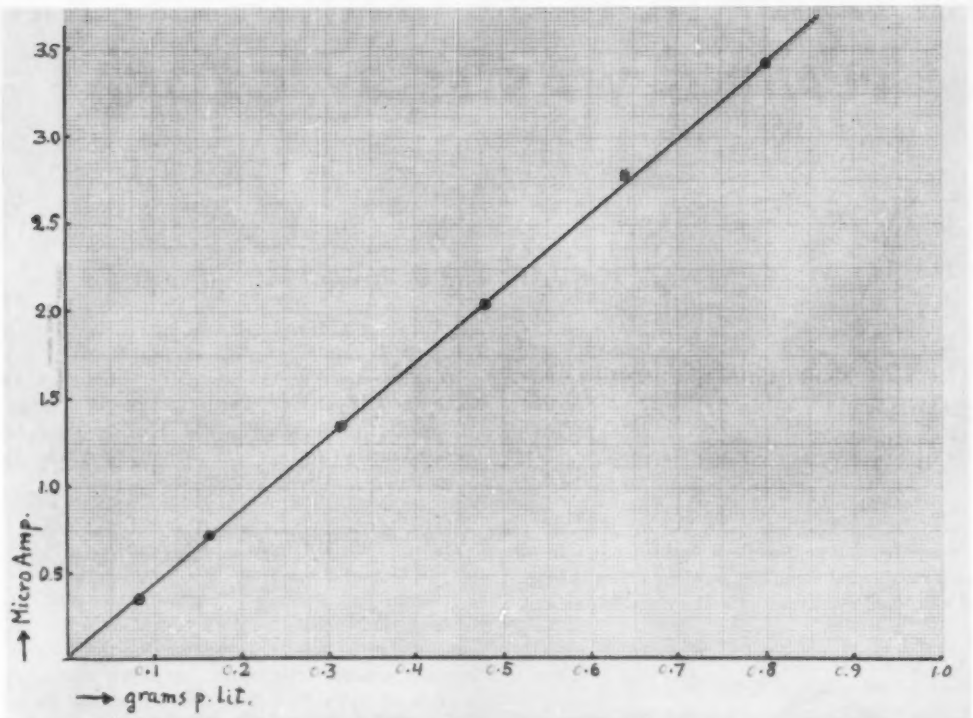

Fig. 3. Calibration curve for cobalt. Six solutions of exactly known metal concentration run on the polarograph and the microamperes obtained were plotted against metal concentration in grams per liter.

calculation of the results the calibration by a series of known standards appears to be faster and simpler.

The concentration of the unknown is then calculated from the following formula:

$$\frac{C^{st} + C^{u}}{C^{u}} = \frac{W^{st+u}}{W^{u}}$$

Where

C^{st} = concentration of standard addition

C^{u} = concentration of the unknown sample

W^{st+u} = Wave height (microamperes) of standard addition plus unknown

W^{u} = Wave height (microamperes of unknown)

Table I gives the results obtained on a number of samples using the polarographic and the standard methods.

Nickel, cobalt and indium in the standard method were determined by electrolysis which for the small amounts proved to be hard to reproduce. In cases where nickel and cobalt were present, they were reported as cobalt plus nickel. A separation by classical methods and in the absence of a spectrograph would be too cumbersome for routine work.

ACKNOWLEDGMENT

This work was done in the analytical laboratory of Sel-Rex Corporation and is published with permission of the Management. It was presented in the December meeting of the Newark Branch of AES.

LITERATURE

Two useful polarographic textbooks are *Polarographic Techniques* by Louis Meites and *Polarography* by Kolthof and Lingane, both published by Interscience Publishers, N. Y.

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Arnold H. Craft was born in 1928 in Kearny, New Jersey, and received his education in the public schools of that town. He received his BS in chemistry in 1959 from Fairleigh Dickinson University.

He started to work in the Assay Laboratories of Engelhard Industries in 1947 and advanced in this department to analytical group leader. From 1951 to 1953 he served in the U. S. Army, Corps of Engineers. In 1959 he joined Sel-Rex Corporation doing research in instrumental analytical methods under Dr. Schumpelt. He is now chemist in the Assay Laboratory of Precious Metals Recovery Corp.

Arnold Craft is a member of the American Chemical Society and the AES.

Dr. Karl Schumpelt is chief electrochemist for the Sel-Rex Corporation. For more than five years he has supervised the company's analytical and metallurgical laboratories, working on the development of new methods for testing and evaluating electrodeposits of precious metals. He received his PhD from the University of Berlin.

THE OXIDATION OF CYANIDE-BEARING PLATING WASTES BY OZONE

PART 2

by N. E. SONDAK* and B. F. DODGE**

DISCUSSION OF EXPERIMENTAL RESULTS

I. Cyanide Solutions

A. Reaction Stoichiometry

The general reaction of cyanide oxidation with ozone to cyanate is:

$$aCN^- + O_3 \rightarrow aCNO^- + bO_2 \qquad (7)$$

where *a* can range from 1 to 3 while b varies from 1 to 0. If a = 1, then b must equal 1 and if a = 3, then b must be 0.

In terms of weight of ozone reacted with cyanide, for a and b to equal to 1,

$$\frac{48 \text{ g } O_3/\text{mol } O_3}{26 \text{ g } CN^-/\text{mol } CN^-} = 1.85 \text{ g } O_3/\text{g } CN^-$$

if a = 3, b = 0 or,

$$\frac{48 \text{ g } O_3/\text{mol } O_3}{3 \times 26 \text{ g } CN^-/\text{mol } CN^-} = 0.62 \text{ g } O_3/\text{g } CN^-$$

Ozone demand is defined as the weight ratio of ozone used to cyanide destroyed. This value will fix the reaction stoichiometry only if equation (1) is the only reaction occurring which involves ozone and cyanide. However, there are other ways in which both ozone and cyanide may be removed. For example ozone can decompose by mere passage through water and through lines, while cyanide can be removed, as HCN, in air bubbled through the solution.

Studies were made of data on the kinetics of ozone decomposition available in the literature[7, 8] and the effluent gases were analyzed for HCN, to fix the region where equation (1) was the only reaction involving CN^- and O_3. This was found to be when the CN^- concentration was over 4 ppm. This was the straight-line, or zero-order, region of the cyanide versus time of ozonation plot. (See Figs. 2, 3, 4 and 5.)

Table VIII presents the ozone-demand results for 31 runs conducted entirely in the zero-order, reaction-rate zone. The arithmetic average for the ozone demand was 1.88 g O_3/g CN^- with an average absolute deviation of 7.0 per cent and a maximum per cent deviation of 17.6. These 31 runs, as can be seen from the table, cover all the flow rates, inlet ozone concentrations and plating solutions, both synthetic and actual, except for copper, used in this investigation.

An error analysis was conducted on the method used to obtain the ozone demand. From this, the expected error was found to be about 5 per cent. This is in good agreement with the per cent deviation actually found.

Comparing the experimentally obtained ozone demand value of 1.88 gO_3/gCN^- with the value of 1.85 for *a* equals 1, b equals 1, in equation (7), it must be concluded that the stoichiometry of the ozone-cyanide reaction is given by equation (4).

B. Reaction Kinetics

1. General Discussion

Figures 2, 3, 4 and 5, for representative runs of this investigation, show that the total cyanide concentration varies linearly with time of ozonation for the bulk of the total cyanide-concentration range. At about 4 ppm CN^-, the plot curves abruptly and then more gradually at 1 ppm CN^-. The slope of the plot is negative throughout. For the linear portion of the plot one can write

$$\frac{d(CN^-)}{dt} = -K_0 \qquad (8)$$

or, in this portion of the plot, the cyanide-ozone reaction is zero order. The slope changes rapidly in the range of 4 to 1 ppm CN^- and then tends to level off below 1 ppm CN. In the 4-to-2-ppm concentration range, the reaction order shifts and the rate of disappearance of cyanide can be approximated as first order and expressed by the equation

$$\frac{d\,(CN^-)}{dt} = -K_1\,(CN^-) \qquad (9)$$

In this region the rate is much lower than in the zero order region.

2. Effect of Inlet Ozone Concentration on Reaction Kinetics

The results of three typical runs conducted at the same flow rate of ozonized-air and temperature but at three different inlet ozone concentrations are also presented in Fig. 2. Similar results were obtained throughout the experimental investigation.

As is shown by this figure, the zero-order, reaction-rate constant increases with increasing inlet ozone concentration while the first-order reaction-rate constant remains essentially the same, independent of inlet ozone concentration.

Figure 7 presents a plot of zero-order, reaction-rate constant K_0, versus inlet ozone concentration for all the runs conducted with pure aqueous cyanide solutions at various temperatures and flow rates. The flow rate of ozonized-air is used as a parameter with the zero-order rate constant varying linearly with inlet ozone concentration. Experimentally, it was difficult to reproduce exactly the same flow rate. The slight

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NOTE—Figures 1 through 6 and Tables I through VII were published in Part 1 of this paper in the February 1961 issue of PLATING MAGAZINE, pages 173–180.

scatter of the data at low flow rates is due chiefly to the fact that some of the points are not at the average flow rate.

Quantitatively, the variation of the zero-order reaction-rate constant with inlet ozone concentration may be expressed as follows:

$$K_0 = 0.588\ C_{O_3} \quad (10)$$

for C_{O_3} between 4.0 and 21.0 at 0.084 ft³/min flow rate

$$K_0 = 0.402\ C_{O_3} + 0.50 \quad (11)$$

for C_{O_3} between 4.0 and 25 at a flow rate of 0.060 ft³/min.

$$K_0 = 0.335\ C_{O_3} + 0.54 \quad (12)$$

for C_{O_3} inlet between 5.0 and 30.0 at 0.045 ft³/min.

TABLE VIII

OZONE DEMAND FOR EXPERIMENTAL RUNS CONDUCTED IN THE ZERO ORDER REGION

Run No.	Ozone Demand g O_3/g CN	Deviation*	Per Cent Deviation**
Aqueous CN Series			
3	1.84	−0.04	−2
7	1.57	−0.31	−17
10	2.02	+0.14	+8
13	1.88	0	0
16	1.94	+0.06	+3
19	1.82	−0.06	−3
23	1.83	−0.05	−3
26	1.94	+0.06	+3
30	1.78	−0.10	−3
33	1.68	−0.20	−11
35	1.86	−0.02	−1
37	1.80	−0.08	−4
40	1.96	+0.08	+4
48	1.86	−0.02	−1
49	1.97	+0.09	+5
54	1.83	−0.05	−3
61	2.11	+0.23	+12
65	1.96	+0.08	+4
*p*H Series			
4	1.82	−0.06	−3
5	1.58	−0.30	−16
6	1.66	−0.22	−12
7	1.61	−0.27	−14
8	2.10	+0.22	+12
9	2.19	+0.31	+17
Zinc Plating Solution Series			
11	1.73	−0.15	−9
12	1.86	−0.02	−1
13	2.21	+0.33	+18
Cadmium Plating Solution Series			
7	2.06	+0.18	+10
8	2.07	+0.19	+10
9	1.89	0	0
Average	1.88		

*Deviation is Ozone demand—average Ozone demand.
**Per cent deviation is deviation divided by average Ozone demand × 100.

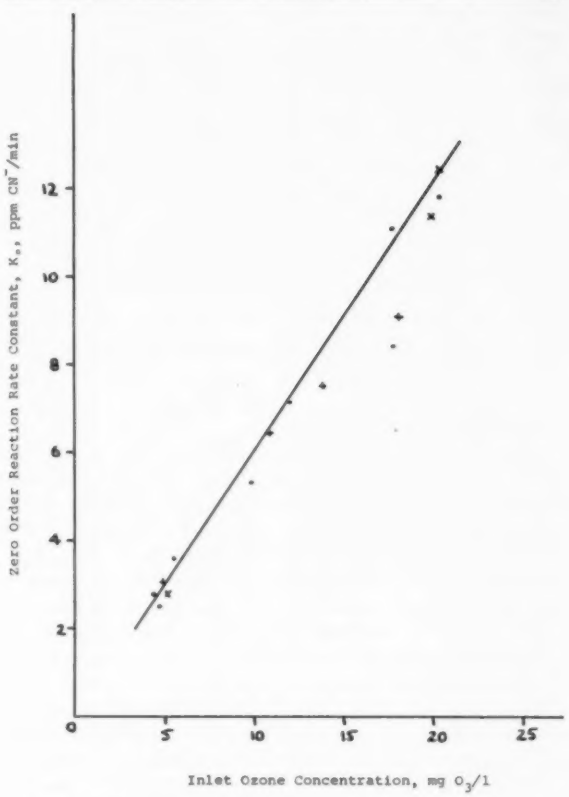

Fig. 7. Zero order rate constant versus inlet ozone concentration at various ozonized-air flow rates.
a) Flow Rate 0.084 ft³/min
b) Flow Rate 0.060 ft³/min
c) Flow Rate 0.045 ft³/min
d) ——— Flow Rate 0.027 ft³/min
— — — Flow Rate 0.024 ft³/min

Legend	Symbol	Run Temperature
	•	30C
	×	50C
	+	80C

3. Effect of Temperature

Figure 7 includes the data of runs at room temperature (26C), 30, 50 and 80C for the pure aqueous cyanide solutions. As can be seen, there is no noticeable effect of about a 54C change in temperature on K_0.

4. Effect of Flow Rate

Figure 8 presents a plot of K_0 versus flow rate with inlet ozone concentration as the parameter. This plot was obtained by cross-plotting the data shown for inlet ozone concentration.

The zero-order rate constant increases, essentially in a linear fashion with increasing flow rate at a given inlet ozone concentration. As is further evidenced by this figure, the effect of increasing flow rate on K_0 is much more pronounced at the higher inlet ozone concentrations. Quantitatively, the slope of the line of K_0 versus flow rate is 0.33 ppm CN^-/ft³-air at an inlet ozone concentration of 5 mg/l while for an inlet concentration of 15 mg/l the slope is 1.02 ppm CN^-/ft³-air.

5. Effect of pH of the Solution

From the data of Table III, it can be seen that at 30C there is a slight increase in the reaction rate at a *p*H of 11.6 over

that for the natural *p*H of 10.3 while at a *p*H of 12.4 the rate increase is about 15 per cent.

The addition of NaOH to solutions at 50 and 80C was also studied. The *p*H values for these runs can only be considered as approximating the actual *p*H of the solution because of the temperature and sodium-ion concentration corrections required. However, the results are quite interesting.

The addition of a small amount of NaOH at 50 and 80C causes a slight increase in reaction rate, but adding still more NaOH to raise the *p*H actually causes a decrease in reaction rate as shown by the reduced K_0 values in Table III. Apparently, at the high *p*H values and temperatures involved, ozone has begun to decompose before it can be reacted with the cyanide present. This is further evidenced by the high ozone demands for these runs.

6. *Effect of Possible Catalysts*

The results of experimental runs using the various catalysts tried are included in Table II. None of these salts had any noticeable catalyzing effect on the reaction. This is not too surprising when one considers that at the high *p*H of the solutions the salts added as possible catalysts would be very insoluble and the concentration of ions that could cause catalysis would be extremely low. This assumes that the catalysis is of the homogeneous type and caused by ions. It is possible of course that heterogeneous catalysis might occur. Furthermore, as will be shown later, the rate of ozone absorption is controlled by the gas film except at very low concentrations of CN and hence a catalyst in the liquid phase could not be expected to have any effect. The chief justification for investigation of a possible effect is the fact that claims of a positive effect have appeared in the previous literature. Our conclusion is that these claims are erroneous.

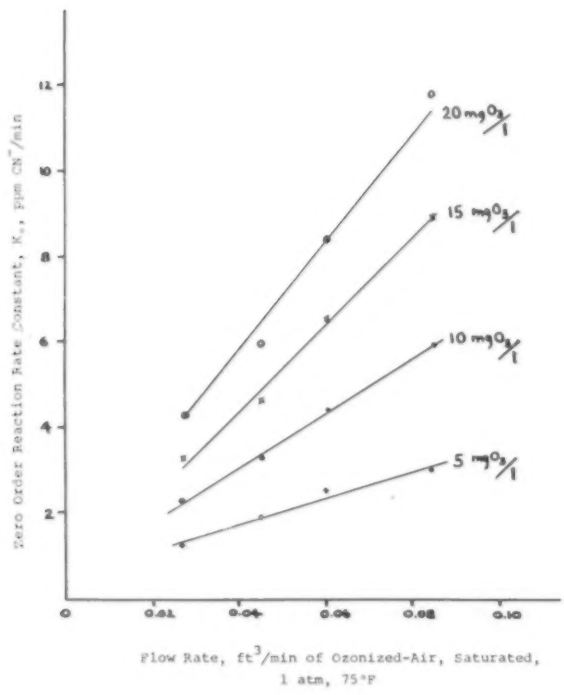

Fig. 8. The zero order rate constant versus flow rate of ozonized-air at various inlet ozone concentrations.

7. *Effect of Reactor Geometry*

Table IV summarizes data obtained for sets of runs at various initial liquid heights but at the same other operating conditions. Studies were made at the four rates used in this investigation. Reducing the liquid height increased the reaction-rate constant and the effect was most pronounced at the lowest flow rate. In this case, K_0 is 3.24 times the value for the usual reactor height of liquid (32.0 in.) when only 31.4 per cent of the usual liquid height is used.

8. *Rate-Controlling Mechanism*

The experimental data obtained in this investigation are correlated very nicely by Hatta's[9] theory of simultaneous absorption accompanied by a rapid chemical reaction. This theory leads to the equation

$$N_A = \frac{(p/H) + (D_B/D_A)\,C_B}{(x_L/D_A) + (1/Hk_g)} \qquad (13)$$

The sum of the two terms in the numerator represents an overall driving force and the sum of the denominator is an overall resistance.

When the concentration C_B is greater than a certain value equal to

$$\frac{x_L\,k_g\,p}{D_B}$$

equatiln (13) reduces to

$$N_A = k_g p \qquad (14)$$

which indicates that the absorption occurs at a rate proportional to the concentration of A in the gas phase and independent of the concentration of B in the liquid.

Equation (14) predicts that:

1) The rate of ozone absorption should be constant at a constant inlet ozone concentration above some limiting value of the latter. This was experimentally found.

2) The rate of ozone absorption should increase linearly with inlet ozone concentration. This also was verified experimentally.

3) Because the gas film is controlling in this region of CN^- concentration increasing temperature or addition of catalysts should have no effect on the rate of ozone absorption. This too was found experimentally.

The general theory further predicts that below a critical value of cyanide-ion concentration, the rate of ozone absorption will drop-off sharply. This also was experimentally verified.

Equation (14) applied to an absorption column such as used in our experiments may be written

$$n = k_g a A h p_{av}. \qquad (15)$$

p_{av} is an average of the partial pressure of ozone over the column which should be obtained by a suitable integration but is, to a good approximation, taken as the logarithmic mean. With experimental values of $k_g a$, this equation could be used to determine the rate of absorption of ozone in a tower of given dimensions or to calculate the height given the diameter and the desired amount of absorption. The absorption coefficient is a function of the flow rate, of the geometry of the system and to some extent of the temperature. By "geometry" is meant the various factors that influence the mass-transfer area such as the dimensions and shape of packing in a packed absorption tower and the number, shape

and size of bubbles in a bubble tower. $k_g a$ should be independent of inlet ozone concentration and this is substantiated reasonably well by our experiments. It should also be independent of the height of packing or the column of liquid in a bubble tower. This was also fairly well substantiated within the experimental error by the data. The value of $k_g a$ should increase with flow rate and our data indicate that it is roughly proportional to flow rate.

Not enough runs were made to establish accurately the quantitative effect of the variables and hence no tabulations of calculated values of $k_g a$ are given but an idea of its order of magnitude may be useful. At the low flow rate of about 0.03 cubic feet per min, $k_g a$ has a value of about 0.10 lb moles per hr per ft^3 per atm and at a flow rate of about 0.07 to 0.08 cu ft per min the values of $k_g a$ varied from about 0.3 to 0.5.

Essentially the same quantitative results were obtained with the plating solutions, both synthetic and actual, as those obtained with pure solutions, except that the K_0 value for copper plating solution was somewhat lower, about 15 per cent, than for pure aqueous cyanide solutions and at higher inlet ozone concentration and low initial cyanide concentrations, the plot of the data for cadmium solutions shows a slight, but definite curvature. However, it was concluded that absorption of ozone is still the controlling mechanism for cadmium solutions.

B. Pure Aqueous Cyanate Solutions

Figure 6 presents the results of the experimental investigation as graphs of cyanate concentration versus time of ozonation or aeration for the case where air without ozone was used. All runs were conducted at the same flow rate and inlet ozone concentration.

1. The Effect of Aeration

A run was conducted at 50C using air without ozone to determine if the air would cause any oxidation of cyanate or if there was any appreciable hydrolysis occurring. The higher temperature was used to emphasize the effect of temperature. There was no noticeable decomposition of the cyanate due to the passage of air through the solution.

2. Effect of Ozonation

There was about a 20 per cent decrease in cyanate concentration after ozonation for one hour at both 30 and 50C. The curve of cyanate concentration versus ozonation time is essentially linear with a slope of 1.4 ppm CNO^-/min at 30C and about 1.3 ppm CNO^-/min at 50C.

These results show no noticeable effect of temperature.

In the run where the initial *p*H was increased to 11.0 by adding NaOH, a slope of 2.1 ppm CNO^-/min was obtained. Apparently, the addition of the base catalyzed the cyanate-ozone reaction.

This was also evidenced by the ozone demands for the various runs:

Run	Ozone Demand, g O_2/g CNO^-
t = 30°	4.34
t = 50°	5.94
*p*H increased	3.05

showing that the ozone was used more effectively in the run at increased *p*H.

The wide variation in ozone demands indicates that the oxidation of cyanate was not the only ozone reaction occurring so that no conclusions can be drawn as to reaction stoichiometry. The cyanate solutions were analyzed for free ammonia to be sure that the decomposition was not due merely to hydrolysis of the cyanate. No hydrolysis was noted in these studies.

For comparison it may be noted that the rate of cyanate disappearance for pure aqueous cyanate was roughly one-fifth that of cyanide under the same ozonation conditions, so that it may be concluded that cyanate ions are oxidized by ozone but at a much slower rate than cyanide ions.

APPLICATION OF OZONATION TO INDUSTRIAL CYANIDE WASTES

Various methods of applying ozone to industrial waste solutions are possible such as, bubble columns, absorption towers, stirred reactors, venturi mixers and the like. Some of the data developed by this investigation were used to design plants for the treatment, on a large scale, of waste cyanide plating solutions; both batch and continuous treatment plants were considered.

The cost of equipment and operation of these plants was estimated and compared to that of chlorine oxidation, the most popular treatment method now used.

The design specifications used were 100,000 gallons waste per 8 hour day with a total cyanide concentration of 200 ppm including 8 ppm Cd, 58 ppm Cu, 63 ppm Zn.

The treated effluent was to have less than 0.5 ppm CN^- or metals at a *p*H of 6 to 8. The cyanate concentration was to be less than 20 ppm.

For the batch system, the following components are required:

1. Storage.
2. Reactor.
3. Hydrolyzer.
4. Ozonator system.
5. Tanks for treatment chemicals other than ozone.
6. Pumps.

In the continuous system, storage is not required. The continuous system is more compact than the batch system, but it lacks the great versatility of the latter. The continuous system has not met with much favor in the field of cyanide waste disposal because, not only the character but the strength and volume of wastes can vary a great deal in short periods of time. Furthermore a continuous system requires automatic control of reagent addition and good instrumentation for this purpose has not been available till recently. Another contributing cause is that the state regulatory bodies have not been convinced of the reliability of continuous methods in the prevention of pollution.

As shown in Table IX, it was found that due to the smaller sized units, the equipment cost for the continuous system was about 15 per cent less than the batch unit. In addition, the cost of the ozonator system was about 67 per cent of the total batch system cost. This was the major cost item. An ozonator with a capacity of 356 pounds per day is required. Since the ozone treatment carries the oxidation only part way beyond the cyanate stage the ozone-treatment plant includes equipment for hydrolysis of the cyanate in order to make the overall treatment comparable in the two cases.

A chlorine treatment plant operating under these same specifications was also designed.

Cost comparisons for the two types of treatment showed

TABLE IX
COMPARISON OF INVESTMENT COSTS AND OPERATING EXPENSES FOR A 100,000-GALLON-PER-DAY PLATING WASTE DISPOSAL PLANT USING OZONE OR CHLORINE[a, c]

Reactant	Ozone		Chlorine
System	Batch	Continuous	Batch
Equipment	Cost, $	Cost, $	Cost, $
Storage	2,200	———	16,000
Reaction	20,600	9,600	10,000
Hydrolyzer	25,400	6,000	———
Ozonator System[b]	172,000	172,000	———
Tanks for Chemicals[g]	900	900	900
Pumps & Mixers[f]	3,000	2,000	6,500
Piping[e]	7,000	3,000	5,000
Total	230,900	194,500	38,400
Operations	Cost, $/Day	Cost, $/Day	Cost, $/Day
Power			
Ozone	71.20	71.20	———
Pumping	0.60	0.60	5.00
Chemicals	32.60	32.60	94.50
Amortization[d]	126.00		21.35
	230.40		120.85

The authors are aware of the fact that these figures are unsupported by any details and that some of them could be varied considerably depending on the exact flow sheet chosen. Lack of time and space does not permit us to present as full a picture on this subject as we should have liked. It is believed, however, that the general relationship between the two processes would not be significantly changed.

a Costs all reduced to a Dec. '56 basis.
b Costs from "Ozone Generation for Industrial Application," The Welsbach Corp., 1956, page 9, figure 4.
c Fifteen per cent of equipment costs used for this charge.
d Twelve year depreciation with money valued at 8 per cent was used.
e Cost of sludge handling not included.

that ozonation was nearly twice as expensive as the use of chlorine as can be seen from the table.

The major factor in the higher cost of ozone treatment was the large amortization cost of the ozone generating equipment. The cost of this equipment, in dollars per pound of ozone capacity, is much lower at tonnage levels. Therefore, as the pounds of cyanide increases, the relative cost differential between ozone and chlorine will decrease.

In the future, when the cost of less-than-tonnage ozone generating equipment drops, it appears that the use of ozone could be as economical as the use of chlorine.

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List of Nomenclature

A = cross-sectional area of absorption tower
C_{O_3} = conc. of ozone in the gas phase, mg per liter
C_B = concentration of component B (CN^- in this case) in the liquid phase, mass per unit volume
D_A = diffusivity of component A (ozone) in the liquid
D_B = diffusivity of component B (CN^-) in the liquid
d = differential operator
H = Henry's law constant
h = column height
K_0 = zero-order reaction-rate constant
K_1 = first-order reaction-rate constant
k_g = gas-film mass-transfer coefficient
k_ga = gas-film mass-transfer coefficient on a volume basis
N_A = absorption rate, mass per unit time per unit area
n = absorption rate, mass per unit time
p = partial pressure of solute gas (ozone)
$p_{av.}$ = logarithmic average of p
t = time
x_L = effective film thickness in the liquid

NOTE — This list contains additions and revisions and should be used in preference to the nomenclature published in Part 1 of this paper.

Dr. Barnett F. Dodge received his BS in chemical engineering from Massachusetts Institute of Technology and was awarded his DSc at Harvard University in 1925. He has taught chemical engineering at Yale University since 1925. He became a full professor in 1935 and was named chairman of the department of chemical engineering in 1936. He was named dean of the School of Engineering in 1960. He was a Fulbright lecturer at the University of Toulouse, France and the University of Lille, France. He has also lectured at the University of Barcelona, Spain; Central University of Venezuela; Worcester Polytechnic Institute; Harvard University and New York University. He is a Registered Professional Engineer in the State of Connecticut.

Dr. Dodge has authored 85 papers which have been published in technical journals and a book on chemical engineering thermodynamics. He is a member of American Institute of Chemical Engineers, American Chemical Society, American Association for Advancement of Science, American Society for Engineering Education, Sigma Xi, Tau Beta Pi, Yale Engineering Association, and New Haven Section of AIChE. He is a Fellow of the American Academy of Arts and Sciences.

Dr. Norman E. Sondak is presently a senior research technologist in the research department of the Socony Mobil Oil Company. He is now on special assignment to the applied mathematics research group, studying computer control and optimization of chemical processes. Previous to this, he was assistant to the senior scientist. Dr. Sondak received his BChE degree from the City College of New York and his Master's degree from Northwestern University. He graduated, with a Doctor of Engineering degree, from Yale University in 1958, where he was also AES Research Assistant. He has been with Socony Mobil at their Paulsboro Laboratory since 1957. Dr. Sondak is a member of Tau Beta Pi, Phi Lambda Upsilon, Sigma Xi, ACS and AIChE. He is also a lecturer in mathematics and engineering at Pennsylvania Military College.

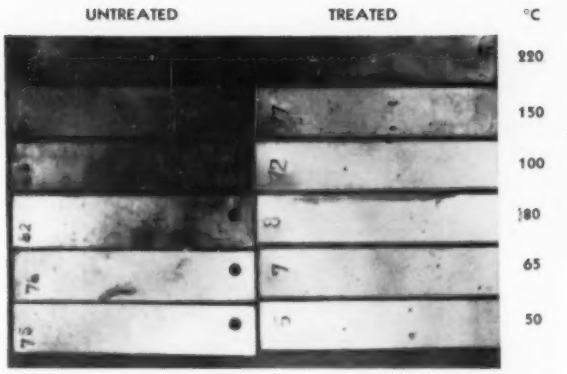

Fig. 1. Appearance of unprotected and protected silver test panels in an atmosphere containing by volume one per cent hydrogen sulfide.

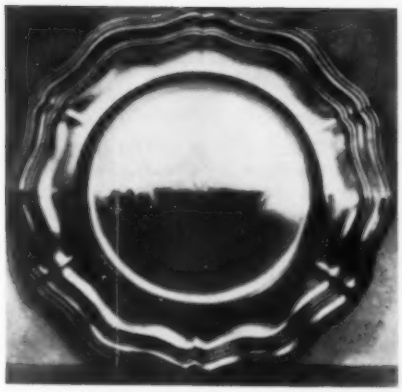

Fig. 2. Silvered plate, one half passivated, the other half untreated, after 10 minutes in a 3.5 per cent hydrogen sulfide atmosphere.

THE PREVENTION OF SILVER TARNISHING

by HEINZ W. DETTNER*

ABSTRACT

Silver tarnishing can be overcome effectively by electrolytic treatment. Two different processes were found practical. The one employs cataphoretic deposition of an oxide layer, the other electrolytic chromating. Details of the operating conditions and results are given.

1. THE PROBLEM

Tarnishing of silver is one of the most serious problems in the jewelry and electrical industries. Besides the deterioration of the decorative appearance, it diminishes the solderability of silver and silver plated parts and causes difficulties in electrical contacting. It is not generally known that tarnishing of silver may also cause unpleasant taste and odor, due to the formation of mercaptane and thiophene, when reducing agents are present. Whereas silver is practically not affected by oxygen (it forms only up to 20Å thin oxide layers, which do not grow, not even at high temperatures), it tarnishes readily by means of the influence of sulfur containing media, especially hydrogen sulfide. Since the air contains practically everywhere, in urban atmospheres traces of sulfur compounds, tarnishing results very easily in the cities. Prevention of silver tarnishing is therefore highly important to many industries.

2. EARLIER PROPOSALS

Several ways have been proposed to avoid tarnishing of silver. Alloying the silver with palladium, indium, zinc or cadmium is one way. However, due to the alteration of the properties of the silver, the increased tendency to oxidation and the yellowish tinge of the alloy (especially with cadmium), alloying was not the right answer. Also, electrolytic deposition of silver alloys on the silver basis metal was found to be impractical, mainly due to the same reasons and the difficulty of bath maintenance, which does not allow the deposition of uniform coatings. Palladium-silver alloy deposits have been utilized only to a very small extent for electric contact parts.

Another way to prevent silver tarnishing is the deposition of a protective metal on the silver surface. Suitable metals are cadmium, indium and the platinum metals. Among these only rhodium is used to some extent for precious electric and optical components, but the high price of the metal forbids further application. Besides this, the difference in color of rhodium and silver is an obstacle to its employment in the jewelry industry.

Also, the selective oxidation of aluminum or beryllium in a silver-aluminum or silver-beryllium alloy was proposed, also treatment in the fluoborate solution of a metal which is more electropositive than silver.[1] This process corresponds to a U.S. patent of C. F. Mathews and I. C. Sawyer.[2] Metal fluorides of the third and fourth group of the periodic system also were proposed.[3] Organic coatings have many disadvantages: they are not completely transparent—especially thick coatings—show poor abrasion resistance and prevent both soldering and electrical contact.

*Schering, A. G., Berlin-Wansee, Germany.

3. NEW DEVELOPMENTS (PROCESS I)

Further research work has led to the development of two different proprietary passivating processes, which are both electrolytic in nature. As mentioned above, oxidation of silver-aluminum or silver-beryllium alloys showed promising results. This was ascribed to the formation of a passivating oxide layer of aluminum or beryllium. Earlier investigations already showed[4] that protective layers were produced without alloying the silver, when oxides of metals of the second, third, fourth or fifth group of the periodic system were deposited by means of direct current. Emphasis was laid on aluminum, beryllium, thorium and zirconium.[5]

Deposition of the metal oxide is performed in the usual way, i. e. the silver is made the cathode in the bath, which contains an aqueous solution usually of the sulfate of the metal. The anode consists of stainless steel.

Since electrolytic deposition of the before-mentioned metals is impossible from aqueous solutions, it is obvious that the formation of the protective layer is due to cataphoresis. The positive charged metallic hydroxides migrate to the cathode. This explains the extraordinary low current density of 0.05–0.2 amp/sq ft, which is employed with this process.

Flocculation of the metallic oxide takes place at the isoelectric point, which is e. g., at a *p*H of 5.83 with the beryllium compound. Considerable importance is placed on rigid control of the *p*H value. Even a variation of 0.1 *p*H causes a marked deterioration of the throwing power. Also, the solution becomes unstable and decomposes. Protective layers produced with these poor solutions show bad performance.

To obtain stable solutions, a comprehensive investigation was performed which showed that the addition of organic complexing agents to the metal sulfate containing solution was very promising. Found to be especially suitable were carboxylic acids or their salts, such as ammonium carbonate.[6]

In a series of performance tests, coatings of this kind proved very tarnish resistant at room as well as at elevated temperatures.

The preparation of the silver basis metal is as follows: The properly cleaned silver surface is cathodically activated in a cyanide electrocleaner at about 50C (120F) for two minutes and a voltage of 8–10. After thorough rinsing, the passivating treatment occurs at room temperature (15–25C or 60–80F). The *p*H of the solution should be maintained between 5.6 and 5.9. The exposure time is 30 seconds, when operating in the high current density range and up to two minutes for 0.05 amp/sq ft. Exceeding the exposure time causes matte, iridescent spots.

In the performance tests passivated and unpassivated test panels were exposed to an atmosphere containing by volume one per cent hydrogen sulfide. Experimental data are given in Table I.

4. FURTHER IMPROVEMENTS (PROCESS II)

The rather low abrasion resistance and the unusual current density led to the development of a second process. Comparative tests indicated that process II exhibits at least the same—if not superior— qualities, especially of tarnish resistance, as process I, but is easier to handle (Fig. 2). Though abrasion resistance leaves something to be desired, it is markedly improved. Thus this process is regarded as one of the best, and has been introduced in many silver finishing shops in Europe.

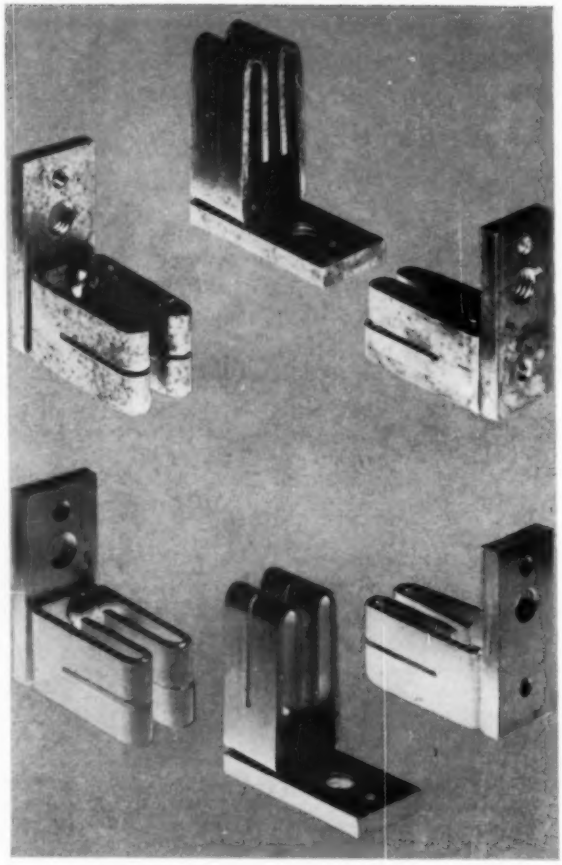

Fig. 3. Silver plated electric contact parts a) above untreated, b) below passivated after 15 minutes exposure in a two per cent potassium sulfide solution.

TABLE I

Temperature °C (°F)	Duration of testing (hrs)	Tarnishing of the Deposits Untreated	Treated
20–25 (68–76)	288	very much	no
20–25 (68–76)	288	much	no
20–25 (68–76)	288	much	no
50 (123)	1	very little	no
	1	very little	no
	2	little	no
	2	little	no
65 (150)	2	little	no
	2	little	no
80 (176)	2	much	no
	2	much	no
100 (212)	2	very much	no
	2	very much	no
150 (300)	2	very much	no
	2	very much	no, blistering
220 (425)	2	very much	no, blistering
	2	very much	very little, blistering

Fig. 1 shows the appearance of some of the test panels after exposure.
The abrasion resistance of silver protecting layers is a rather critical fact. Since thickness of the coatings is in the range of 0.01 mil, one cannot expect considerable abrasion resistance. High mechanical strain therefore should be avoided.

One word may be allowed about the evaluation of the two processes. Though the author feels that the subsequent process (II) is somewhat superior with regard to the abrasion resistance, this should not mean, that process I is regarded unsatisfactory. It is conceivable, that further research work may cause a decided improvement. Thus process I should not be omitted in a survey of silver passivating processes.

Process II is a chromate process. As one knows, chromate conversion coatings have found wide application for zinc, cadmium, aluminum and some other metals. Therefore it is obvious that this process also is used for silver. The so-called Finckh process[5a] employs chromates or bichromates or chromic acid, copper ammonium chloride and/or persulfate. P. Baeyens and J. L. Melse[7, 8] passivated silver by immersing in a solution of more than 5 g/l of an oxygen compound of hexavalent chromium, and a complex silver ion forming in an amount greater than 1 g/l. However, it was found that chemical chromating processes for silver can be markedly improved by the action of current. One early reference for electrolytic chromating of silver is to J. E. Stareck and L. M. Corliss,[9] who claimed electrolytic deposition from a solution, which contained alkali chromate and SO_4, F, SeO_4 and/or SiF_6 at a *p*H value of 2 to 7. Further a German patent[10] claims electrolytic treatment in a chromic acid or chromates containing solution, to which was added sulfuric or hydrochloric acid.

R. S. Mason claims[11] that silver can be protected by cathodic treatment in a wide range of chromate and dichromate containing solutions. Our investigations showed, that this is not true, at least with regard to silver, on which solutions according to the patent result in colored and un-uniform coatings with poor tarnish resistance. However, transparent protective layers were deposited, when alkali metal chromates in combination with carbonates were employed in the alkaline range, i.e. at a *p*H of 7.5–13—a *p*H of 8 being the preferable value. The current density is about 80 amp/sq ft, with an exposure time of five minutes. Lower current density requires prolonged treatment time, as 15 minutes for 40 amp/sq ft.

Silver passivating treatment furnishes an invisible protective layer on silver and silver plated parts. The reflectivity is reduced by only two to three per cent. In the course of time the reflectivity diminishes, especially in acid containing atmospheres, but normally the surface remains unchanged for about six months. Also the solderability remains unchanged. Electrical transition resistance is not markedly raised, so that parts passivated in this way, may be used in the same manner as unprotected parts for electric contacts and other assembly components.

For evaluating the tarnish resistance of the protective layers, three passivated samples and one untreated were placed in an atmosphere containing by volume 0.2 per cent sulfur dioxide and 0.002 per cent hydrogen sulfide. The specimens were observed continuously until tarnish was evident. At that time the test was concluded.

This test simulated the exposure to an atmosphere containing one hundred thousand times the amount of hydrogen sulfide and sulfur dioxide normally found in New York City. The New York City Air Pollution Laboratory supplied the following information for New York City:

Hydrogen Sulfide: 2 parts per billion
Sulfur Dioxide: 2 parts per billion

Table II indicates the time at which there was visual evidence of tarnish upon exposure to 0.2 per cent sulfur dioxide and 0.002 per cent hydrogen sulfide.

TABLE II

Specimen	Time (Minutes)
No. 3 Passivated	100
No. 4 Passivated	100
No. 5 Passivated	100
No. 2 Untreated	20

The tarnish of the untreated specimen was judged as a complete breakdown after 20 minutes of exposure, while the breakdown of the passivated surface was partial after 100 minutes, this means a five times longer period at which breakdown occurs.

Production type testing of the protective value of the passivating treatment is very easily performed. A properly passivated silver part must withstand a 15 minute dip in a two per cent potassium sulfide solution (Fig. 3).

ACKNOWLEDGMENT

The author wishes to express his appreciation to Schering AG, Berlin, for permission to publish details of the Argalin process.

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[10]Inventor unknown, Ger. 630.934 (June 23, 1933)
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Dr. Heinz W. Dettner is a native of Duisburg, West Germany, and is now living in Western Berlin. He received his education at Berlin and Aachen Technical University, where he was awarded a Master's degree in chemistry in 1944 and DSc degree in 1948.

After employment with various German electroplating supply houses as chemist and chief chemist, he joined the Schering A. G., Berlin as scientific adviser on the staff of the electroplating department.

His field of activity principally has been with the corrosion resistance of electroplated metal coatings, especially chromium. He has published many papers, mainly in German, and some books on electroplating. Dr. Dettner arranged the German edition of A. G. Gray's "Modern Electroplating." He is the editor of the new German/English Electroplating Dictionary.

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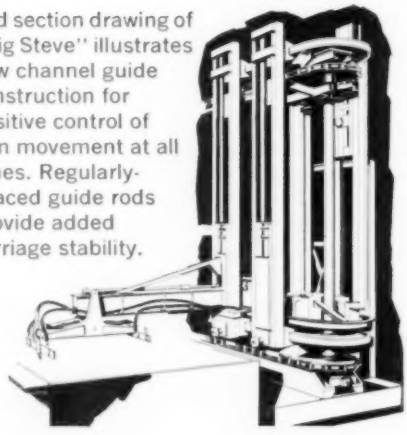

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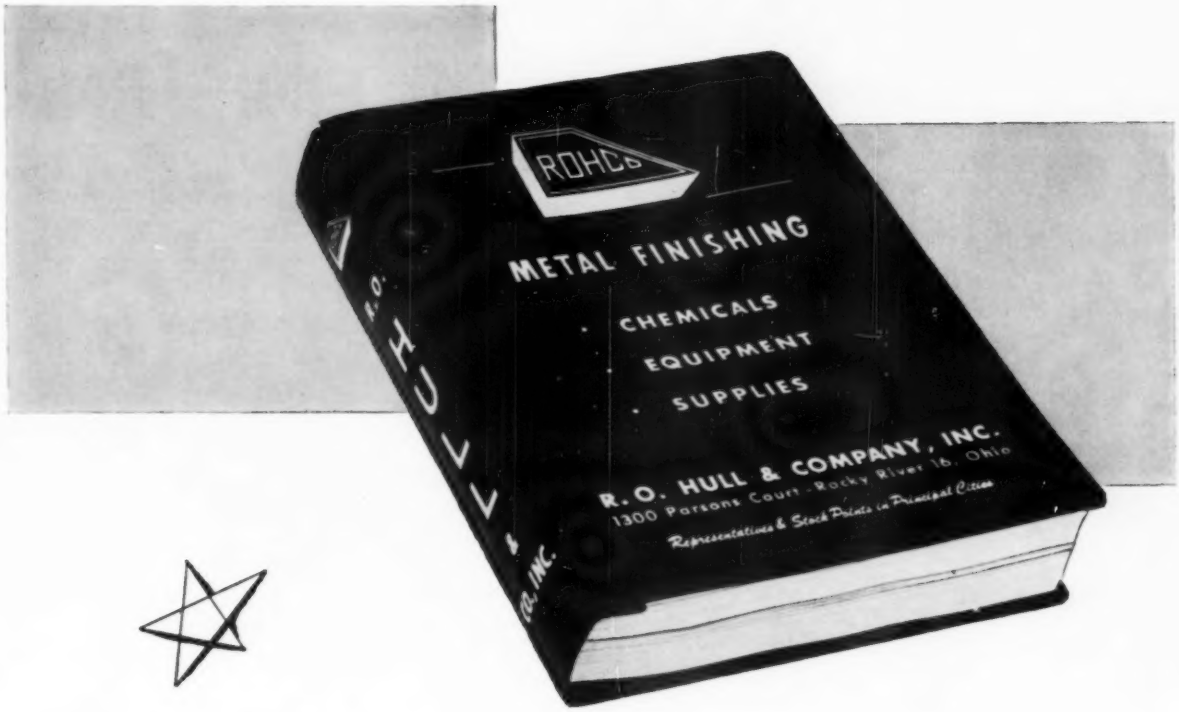

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ABUNDANT EDUCATIONAL FARE IN IMPORTANT AES MEETINGS AHEAD

Education is the business of American Electroplaters' Society (AES), and important means and media thereof are AES's Branch and Regional Annual Meetings. Immediately ahead are a number of significant such meetings.

March features the Annual Meetings of the Philadelphia Branch (March 3–4); Dayton Branch (March 4); Rockford Branch (March 11) and the Toronto "Symposium on Metal Finishing" (March 28).

In the month of April, educational fare will include the Annual Educational Session of the Los Angeles Branch (April 8); the traditional Annual Meeting of the Baltimore-Washington Branch at which National President W. A. Wesley will receive his "pot" of the "Order of Past Presidents" (April 15); the Twenty-Second Annual New England Regional Meeting, Hartford, Conn. (April 22) and the Milwaukee Branch Annual Educational Session and Banquet (April 29).

April will conclude with the heralded two-day AES Research Conference to be held at the Bell Telephone Laboratories, Murray Hill, N. J., April 24–25, 1961.

INVITATION TO AES BRANCHES TO HOST 1967 AES CONVENTION

Under its recorded policy whereby it chooses AES National Convention site and Host Branch six years in advance, the Supreme Society, AES's summit governing council, will select, at its Annual Meeting, Boston, Massachusetts, June 22, 1961, the site and Host Branch of the 54th Annual Convention of the Society to be held in 1967.

Any AES Branch wishing to be considered by the Supreme Society as possible Host of that 1967 Annual Convention is invited to have its documented invitation in the hands of the National Executive Secretary by or before June 1, 1961 for the preliminary consideration of the Executive Board at its meeting on June 18.

Interim Meeting sites, moreover, are now chosen by the Supreme Society two or more years in advance. Any AES Branch desiring Supreme Society consideration as possible Host Branch of the 1963 Interim Meeting is urged to have its documented invitation in the hands of the National Executive Secretary by or before June 1, 1961.

AES/MFSA BOARDS HOLD ANNUAL MEETING

Meeting jointly, for the fourth successive year, on the eve of the Interim Meeting of the AES Supreme Society, the Executive Board of the AES and the Board of Trustees of the Metal Finishing Suppliers' Association (MFSA) discussed effectively a number of subjects of mutual importance, including the AES's Sixth Industrial Finishing Exposition to be held at the Keil Auditorium, St. Louis, Missouri, June 16–18, 1964.

In memory of the late August P. Munning, deceased Executive Secretary of MFSA and also a long-time AES stalwart, the conferees observed a moment of silence.

Subjects discussed at that meeting held at the Statler-Hilton Hotel, Friday evening, February 10, included the attendance growth of Branch Educational Meetings in many AES Branches during the past year, and the ever-improving quality thereof.

The meeting lauded the effectiveness, moreover, of many of the receptions cooperatively sponsored by member companies of the MFSA at AES Conventions and Regional and Branch Annual Meetings, and the AES expressed its appreciation to the MFSA for them.

The next joint meeting of the respective Boards will be held on Friday, January 12, 1962, at the Hotel Marott, Indianapolis, Indiana, on the eve of the Society's Ninth Interim Meeting.

AES AND MFSA EXECUTIVES DISCUSS MATTERS OF MUTUAL INTEREST

(L. to r., facing camera, top row). J. A. Cairnes, Allied Research Products, Inc.; Ralph D. Wysong, Studebaker-Packard Corp.; Ezra A. Blount, Products Finishing; Frank O. Beuckman, Eastman Kodak Co.; John Davidson, Pennsalt Chemical Co.; Fred P. Green, Crown Rheostat & Supply Co.; Dr. W. Andrew Wesley, International Nickel Co.; John E. Trumbour, Metal Finishing; G. E. Huenerfauth, Crown Rheostat & Supply Co.; Manson Glover, Glover Coatings Co.; Manuel Ben, General Motors Corp. (second row) Eugene L. Combs, Diamond Alkali Co.; John P. Nichols, American Electroplaters' Society, Inc.; King Ruhly, Michigan Chrome and Chemical Co.; A. E. Hoefer, Frederic B. Stevens Co.; Jeffrey Carrique, Alloy Craft Ltd.; Dr. Henry L. Kellner, Lea Mfg. Co.; Earle W. Couch, Lea Mfg. Co.; Robert M. Norton, Hanson-Van Winkle-Munning Co.; H. J. McCracken, Northwest Chemical Co.; Chester G. Borlet, Grand Rapids Brass Co.

AES NEWS

EDUCATION AND ENTERTAINMENT FILL TWO EVENINGS AT CLEVELAND

The Cleveland Branch of the American Electroplaters' Society held its Technical Session and Annual Dinner Dance on January 27 and 28.

On the evening of the 27th, Ralph Botosan, the assistant librarian, introduced the speakers. C. H. Junge of the Cleveland Graphite Bronze Co. spoke on "Metallurgy for Electroplaters," and Arthur H. DuRose of the Harshaw Chemical Company discussed "Electroplating—Art or Science." Our guests from the National Society, Dr. W. Andrew Wesley, president, and Frank O. Beuckman, third vice president, were introduced, and each commented on the importance of continuing the quality of the educational sessions.

The affair was climaxed by the Dinner Dance on the 28th. It was preceded by a cocktail party sponsored by the Metal Finishing Suppliers Association. Carl Clabaugh of Cowles Chemical chairmanned the affair. A turkey dinner was served at 7:00 p.m. and a five-act floor show provided over an hour of enjoyable entertainment. A midnight snack was sponsored by the MFSA and the affair was concluded at 1:30 a.m.

THREE SPEAKERS ON VARIED SUBJECTS AT LOS ANGELES ANNUAL MEETING

The Los Angeles Branch of the AES has announced three prominent speakers for their Annual Educational Session on April 8 at the Statler Hilton Hotel in Los Angeles. The Annual Dinner Dance will take place that same evening.

E. C. Rinker, vice president and technical director of Sel-Rex Corporation, Nutley, New Jersey will speak on "Space Age Precious Metal Plating." Dr. Frederick A. Lowenheim, laboratory manager of Metal & Thermit Corporation, Rahway, New Jersey will present a paper on "Alloy Plating" and Dr. Edward B. Saubestre, technical director of Enthone, Inc., New Haven, Connecticut has chosen as his subject, "Electropolishing."

A reception will be held in the Sierra Room from 6:30 to 7:30 p.m. The dinner dance will follow immediately in the Pacific Ballroom. There will be door prizes, and favors for the ladies. Carroll Wax and his Orchestra will provide music during the banquet and for dancing.

Requests for reservations should be addressed to Harold Wanamaker, 1934 Cogswell Road, El Monte, California.

SOCIETY'S FINANCIAL STRUCTURE REPORT FINALIZED BY EXECUTIVE BOARD AT HARTFORD MEETING

Meeting in executive session at the Statler-Hilton Hotel, Hartford, Connecticut, all day Friday, February 10, on the eve of the Supreme Society's Eighth Interim Meeting and with National President W. Andrew Wesley presiding, the Executive Board disposed of a large agenda of AES policy and procedural matters. It completed that business at its meeting on Sunday, February 12.

At its Friday meeting, the Board analyzed the Society's financial operating record made during the first six months of the current fiscal year, then finalized its comprehensive Board report as to the Society's financial structure that it presented on the morrow to the Supreme Society, summit governing council of AES. At its meeting, the Board also studied the results of the Society's most recent membership census, and evaluated the progress made by the aggressive membership expansion campaign undertaken at the start of the current fiscal year, July 1, 1960, on a regionally directed basis.

AMENDMENTS OF AES LAW PROPOSED

In connection with AES's enlarged technical book publishing program, it authorized its National President and National Executive Secretary to enter the Society into a contract with a prominent technical book publisher to publish a book on the subject of "Finishing of Aluminum" to embody not only the four papers to be presented at its "Finishing of Aluminum" Symposium at the AES's 48th Annual Convention, Boston, Massachusetts, June 18–23, 1961, but also to include six other papers on that subject to be prepared by other experts under the coordination and editorship for AES of Dr. Gerald Kissin of the Kaiser Aluminum and Chemical Corporation. The four Boston Symposium papers will be published in the book only after first publication in AES's TECHNICAL PROCEEDINGS (1961 Edition).

The Board also approved the final budget of the Society's 48th Annual Convention. It also finalized certain AES Constitutional and Bylaw amendments to be proposed by it to the Supreme Society, including 1) AES Constitutional and Bylaw alteration requiring Per Capita Tax to be paid by Branches for new members covering the entire fiscal quarter during which elected and thereafter, 2) a change of AES Bylaw nomenclature from "Branch Librarian" to "Branch Educational Chairman" and 3) broadened scope for the Publications Committee of the Society.

The Board also considered the report of the Honorary Membership Awards Committee and it approved four candidates for nomination for AES Honorary Membership by their respective Branches at the Supreme Society's Annual Meeting, June 22, 1961. It also readied itself for its April meeting at which not only the 1961–1962 operating budget will be finalized for reference to the Supreme Society but where also, among other important business, it will make most of its appointments to 1961–1962 Standing Committees.

BOARD PROPOSES PER CAPITA TAX RISE

At its Sunday meeting following the prior day's Interim Meeting, the Board finalized proposed Constitutional and Bylaw amendments for reference to the Annual Meeting of the Supreme Society in Boston in June 1961 embodying both a proposed general increase in Per Capita Taxes for all AES Active Members and a dues increase for all Members-at-Large, effective the fiscal year commencing July 1, 1962, so as to avoid need for any further foreseeable annual AES operating subsidies from the Society's reserve funds. Despite operating economies consistently effected in past years, it arranged, moreover, for a penetrating study of every possible way and mean of reducing AES operating costs even further, without affecting the scope, quality or efficiency of AES services, for consideration by the Executive Board when it prepares the 1961–1962 operating budget at its April 1961 meeting.

Present at both days' Board meetings beside President Wesley were First Vice President Chester G. Borlet; Second Vice President Manuel Ben; Third Vice President Frank O. Beuckman; Immediate Past President Ralph D. Wysong and National Executive Secretary John P. Nichols.

CANDID VIEWS OF THE EIGHTH INTERIM MEETING AT HARTFORD

(1) Dais at the opening session. L. to r., Richard C. Barrett, Host Branch Co-Chairman; Manuel Ben, National Second Vice President; Chester G. Borlet, National First Vice President; Dr. W. Andrew Wesley, at podium, National President; John P. Nichols, National Executive Secretary; Frank O. Beuckman, Third Vice President; Ralph D. Wysong, National Past President; Allen Ferguson, Host Branch Co-Chairman. (2) Mayor DeLucca welcomes the Supreme Society to Hartford. (3) Group at the registration desk. (4 & 5) Views from two different angles of the morning session of the AES Supreme Society. (6 & 7) Delegates and Alternate Delegates at "Dutch-treat" luncheon. (8) The Co-Chairmen of the Interim Meeting: Richard C. Barrett, left, and Allen Ferguson. (9) The Interim Meeting in its afternoon session. (10) Edward E. Oberland, whose candidacy for the Third Vice Presidency of the AES was announced at the Interim Meeting of the Supreme Society.

HOST: AES
NEW ENGLAND
REGIONAL

INTERIM MEETING REPORTER

STATLER-HILTON HOTEL
HARTFORD, CONN.
FEBRUARY 11, 1961

SUPREME SOCIETY PREVIEWS MATTERS TO BE LEGISLATED AT ITS JUNE ANNUAL MEETING

Held at the Statler-Hilton Hotel, Hartford, Connecticut, Saturday, February 11, 1961, the Eighth Interim Meeting of American Electroplaters' Society, Inc. (AES) was attended by representatives of 25 AES Chartered Branches who traveled from far and near to attend it despite the travel inconveniences to and from Hartford caused by recent large and recurring snowfall. The meeting was arranged for the Supreme Society, AES's summit governing council, by the AES's New England Regional Group, with the Bridgeport Branch as Host and Allen Ferguson and Richard C. Barrett of that Branch as Co-Chairmen.

The Eighth Interim Meeting held on Saturday was preceded by an all-day Friday meeting of the Society's Executive Board that was, in turn, followed on Friday evening by a joint meeting of that Board and the Board of Trustees of the Metal Finishing Suppliers' Association (MFSA). Such a joint Board meeting is now traditionally held annually on the eve of AES Interim Meetings.

Before the Supreme Society meeting on Saturday morning, furthermore, the Educational Committee of the Society met and disposed of a sizable agenda of business. Present besides Chairman Ralph McCahan were Committee Secretary Edward Bertuccio, Chester G. Borlet, Ezra A. Blount and Dr. Nelson Murphy.

"SENSE OF MEETING" ACTION TAKEN

With National President W. Andrew Wesley presiding, the Supreme Society meeting convened at 10 a.m., with authority preliminarily to discuss AES policy and other matters likely to appear on the Agenda of that governing body at its Annual Meeting to be held in Boston, June 22, 1961, but unempowered to legislate or otherwise officially act upon them at the instant Interim Meeting.

After being welcomed to Hartford by its Mayor, and after hearing the semi-annual reports of all six National Officers, the Interim Meeting then also heard a comprehensive analysis of the Society's financial structure and status, with each of the six National Officers treating a specific phase thereof. A substantial discussion resulted from the Board's proposal to increase, necessarily, the Society's income by boosting the current rate of Per Capita Taxes of Active Members, thus enabling the Society to balance its annual income and expenditures without any further foreseeably necessary subsidy from AES reserves.

Results of the Interim Meeting included these "sense of the meeting" actions or other transactions:

1. It heard a comprehensive discussion of the current status of the Society's eight Regional Groups and Councils, and their structure, objectives and accomplishments, direct from representatives of the Regional bodies.
2. It anticipated the completion of the "Twenty-Five Year Scroll" form that can then be purchased from National Headquarters by respective chartered Branches, and processed by them for delivery, at will, to their respective members in good standing having twenty-five year or more AES membership longevity.
3. It referred back to the Executive Board for study and action, the matter of balancing the AES's annual operating income and expense without further resort foreseeably to General Fund subsidy.
4. It heard proposals by the Executive Board, moreover, for AES Constitutional and Bylaw amendments a) requiring Per Capita Tax to be paid by Branches for new members starting with the entire fiscal quarter during which elected, b) changing AES Bylaw nomenclature from "Branch Librarian" to "Branch Educational Chairman," and c) broadening the scope of the Publications Committee.
5. It heard announcement by Arthur G. Pierdon, Baltimore-Washington Branch, of the candidacy for AES National Third Vice President of Edward E. Oberland of the Western Electric Company, Baltimore, Maryland, and the Baltimore-Washington Branch.

National President W. Andrew Wesley opens Interim Meeting

6. It heard announcement of the invitation by the Kansas City Branch to host the Society's Tenth Interim Meeting in January 1963.

Immediately following the Interim Meeting's adjournment at about 5 p.m., the assembled Delegates, Alternate Delegates and other Branch Representatives were guests of National Headquarters at an hour-long Reception.

FELLOWSHIP FOLLOWS BUSY DAY

At the Saengerbund Hall in Hartford that same Saturday evening, the assembled National Officers, Delegates, Alternates and Branch Representatives, including members of Branches of the AES New England Regional Group, namely Bridgeport, Hartford, New Haven, Waterbury, and Springfield, enjoyed a "dutch treat" Old Timers' Night sponsored by those five New England Branches. A feature was the presence there of the oldest selected living members of the respective Branches in point of AES longevity.

Arranged by the Branch Presidents of AES's New England Regional group, and with Bridgeport Branch President William Hyatt making the introductions, the five selected oldest members of the respective New England Branches in point of AES length of membership, were presented to National President Wesley who, in turn, honored each with a suitably inscribed plate.

The sizable audience having partaken of a splendid "smorgasbord," then also enjoyed an entertaining after-dinner speaker. The Ninth Interim Meeting of the Supreme Society will be held January 13, 1962 at the Marott Hotel, Indianapolis, Indiana, with the AES's Indianapolis Branch as Host.

YOUR PLATING MAGAZINE QUESTIONNAIRE

So as to assure that PLATING MAGAZINE's classification of its subscribers by number, function and geographical location is constantly and consistently up to date for Audit Bureau of Circulations audit, a Return Sheet was recently issued to each subscriber internationally. It is revealing that nearly 50 per cent of such Return Sheets issued were executed and returned by subscribers within ten days of issuance, with the flow, of course, continuing. If you have not yet accomplished and returned yours, your cooperation in doing so promptly will be appreciated by AES and PLATING.

HEAVY SNOW POSTPONES NEW YORK ANNUAL MEETING

The storm that filled the canyons of New York City with record drifts of snow forced the New York Branch to postpone its Annual Technical Session and Banquet. On the morning of February 4, the raging storm made it evident that very few people would be able to reach the Statler Hotel and the committee in charge of arrangements promptly postponed the annual occasion until Saturday, February 18.

The entire affair was rescheduled—afternoon Educational Session with three technical papers, ladies' entertainment in the afternoon, Cocktail Party hosted by the MFSA, and Banquet with entertainment and dancing in the evening.

REMINDERS TO AES CHARTERED BRANCHES

Your Branch's 1960-1961 fiscal year membership expansion quota is 10% over the number of your Branch's members in good standing as at June 30, 1960, meaning 10% more members than your Branch membership on July 1, 1960 before any subsequent suspensions or resignations for 1960-1961 Per Capita Tax purposes.

Your Branch, through its President of record, has been invited to nominate any member of the Society whom it chooses for consideration for the Charles Henry Proctor Memorial Leadership Award for 1960-1961. Signed by both your Branch President and Branch Secretary, your nominating return sheet is due in the hands of the National Executive Secretary by not later than April 1, 1961, accompanied by SEVEN copies of a resume of your nominee's 1959-1960 deeds upon which the nomination is being predicated.

FIVE NEW ENGLAND "OLD TIMERS" HONORED AT GALA EVENT

Representing some 188 years of combined longevity as AES members, the five selected oldest members of the five Branches of the AES New England Regional group, namely Bridgeport, Hartford, New Haven, Springfield and Waterbury, were the honored and featured guests of the "Old Timers Night" held at the Saengerbund Hall, Hartford, Connecticut, Saturday evening, February 11, 1961 following the Society's Eighth Interim Meeting.

Sponsored by the AES New England Regional Group, with Allen Ferguson and Richard C. Barrett of the Bridgeport Branch as Co-Chairmen, the event was attended by all AES National Officers and by Delegates and Alternate Delegates who were present at the Interim Meeting. Also present were members of the five Branches composing the AES's New England Regional Council.

The AES New England Branch veterans honored were Philip Prouty of the Springfield Branch who joined AES in 1928; Vernon Grant of Hartford Branch who joined in 1926; William Gray of Waterbury Branch who became a member in 1921; Albert Jaekle of New Haven Branch who joined in 1931 and Raymond O'Connor of Bridgeport Branch who became a Bridgeport Branch member in 1921.

New England Regional "Old Timers" award.

As each of the five veterans was presented to National President W. A. Wesley by Bridgeport Branch President William Hyatt of the Region, he was presented with a suitably inscribed plate.

(TOP) "Old Timers" receive inscribed plates. Left to right, Raymond J. O'Connor, Bridgeport Branch; Albert O. Jaekle, New Haven Branch; William V. Coleman recipient for William T. Gray, Waterbury Branch, unable to be present; Vernon E. Grant, Hartford Branch; Philip W. Prouty, Springfield Branch. (BOTTOM) Branch Presidents composed "Old Timers" Committee. President William C. Giesker, Waterbury; President Alexander R. Salmond, Springfield; Allen Ferguson, Interim Meeting Co-Chairman; President William Hyatt Jr., Bridgeport, Old Timers Night Chairman; President Walter J. Dyber, Hartford; Richard C. Barrett, Interim Meeting Co-Chairman; President Harry R. Taylor, New Haven.

STAR-STUDDED SYMPOSIUM FARE FOR TORONTO BRANCH MEETING, MARCH 28

Featuring a star-studded educational program, the "First Symposium on Metal Finishing" of the Toronto Branch of American Electroplaters' Society, Inc. (AES) will be held at the Seaway Hotel of that Canadian municipality on Tuesday, March 28, 1961, with a sizable international audience of AES members expected to be present, including National President W. Andrew Wesley and National Executive Secretary John P. Nichols. Herbert A. Skelton of the International Nickel Company is the ambitious event's General Chairman.

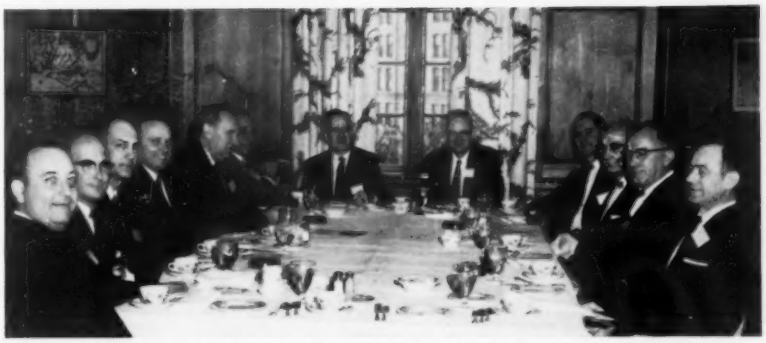
During the day, the Toronto Branch will present as its speakers, such experts as Cleveland F. Nixon, General Motors Corporation, Detroit; Clarence H. Sample, International Nickel Co., New York; Dr. A. Kenneth Graham of Graham, Crowley & Associates, Jenkintown, Pennsylvania; F. A. Sweet, Canadian Standards Association, Ottawa, Ontario and Dr. A. E. Berry, Ontario Water Resources Commission, Toronto, Ontario.

The all-day Toronto Symposium will be interrupted at midday by a Luncheon Session that will, in turn, present as special speaker, W. H. Evans, President, Honeywell Controls Limited of Leaside, Ontario, and who is also a recent Past President of the Canadian Manufacturers Association. Branch President Gordon A. Lince, International Nickel Company will preside at the Luncheon.

Tickets priced at $7 per person for the entire program, including luncheon, are available on an advance registration basis through M. S. Green, Postal Station "U", Toronto 18, Canada.

FUTURE MEETINGS

Education is the business of AES. For National, Regional and Branch educational and other AES meetings ahead, see PLATING's section titled FUTURE MEETINGS herein.



National Officers of the Society; Officials of the Blue Ridge Branch and speakers for the Dixie Regional meeting at luncheon. Speakers not in the picture are Dr. Harold J. Read and Ezra A. Blount.

SIGNIFICANT EDUCATIONAL SESSIONS FEATURED ANNUAL DIXIE REGIONAL MEETING

Welcomed by published greeting from Mayor Willis M. Anderson, AES's North and South blended at the Society's two-day Third Annual Dixie Regional Educational Session and Banquet at the handsome Roanoke Hotel, Roanoke, Virginia, February 3–4, 1961, and the large though weather-lessened AES audience both benefitted educationally from the wealthy Educational program and had an enjoyable time.

With the young, dynamic Blue Ridge Branch as Host, planned and programmed by a departmentized Blue Ridge Committee headed by Branch President B. E. Wallace, the two-day event led off with an Opening Session featuring a keynote address titled "This Age of Man" given by Dr. Louis Arthur Pardue, Dean of Graduate Studies, Virginia Polytechnic Institute. National Officers present were First Vice President Chester G. Borlet and Executive Secretary John P. Nichols.

Technical Speakers, programmed by Educational Chairman Nelson F. Murphy, who presented papers during the two-day event, included C. H. Castle, Abrado Finish Corp. ("The Application of Barrel Finishing Methods and Equipment"); Henry B. Koehler, Hanson-Van Winkle-Munning Co., ("The Importance of Rectifier Control in Plating"); C. G. Haupt, Norfolk & Western Railway Company ("Aspects of *p*H in Electroplating"); Dr. Harold Read, Pennsylvania State University ("Hydrogen Embrittlement in Electroplating"); Ezra A. Blount, Editor, "Products Finishing" ("The Japanese Finishing Industry Today") and J. Winters, Incar, Inc. ("The Anode Side of the Story").

The two-day event was sweetened by such delightful fellowship events as a "Get-To-gether Party" sponsored by the MFSA on Friday evening—by a pre-Banquet Cocktail Party on Saturday evening—by an ambitious two-day Ladies Program. On Saturday afternoon, the Delegates of the Southeastern, Memphis-Midsouth, Blue Ridge and Miami Branches composing AES's Dixie Region met in executive session, and determined that Host Branch of the Fourth Annual Dixie Regional Educational Session and Banquet will be the Southeastern Branch, with site being Atlanta, Georgia, and with February 10–11, 1962 being the dates of its occurrence.

That evening's Banquet filled the Main Dining Room of the Roanoke Hotel, and was followed by a floor show and dance. Door prizes were another feature of the enjoyable evening.

Representatives of the Dixie Region welcome Memphis-Midsouth Branch as a new member of the Dixie Region. Branch Secretary-Treasurer P. R. Dickinson (third from left) attended the meeting as the official Memphis-Midsouth representative.

Scene at banquet marking close of Dixie Regional Meeting at the Hotel Roanoke, Roanoke, Va. Representatives of Blue Ridge Branch and Miami Branch are shown at the table in the foreground.

The plaque (above) signifying Chicago Branch Honorary Membership presented in absentia to Past National President H. A. Gilbertson at Chicago Annual Meeting, January 28. Left to right, Branch Secretary-Treasurer Paul Glab, Branch Board Chairman Charles Geldzaler and Branch Past President R. Scott Modjeska who made the absentia presentation.

INTERNATIONAL PLATING DISCUSSED IN CHICAGO

The Chicago Branch, in conducting its 49th Annual Education Session and Banquet at the Conrad Hilton Hotel of that municipality, Saturday, January 28, pegged its educational theme to the international electroplating and metal finishing subject, and brought two well-versed AES stalwarts to the rostrum to discuss "Plating in Foreign Lands."

With S. P. Gary presiding, the large audience, including four of AES's six National Officers plus Past National President Clyde Kelly, heard Myron B. Diggin, Vice President, Hanson-Van Winkle-Munning Co., appraise the plating industry in today's Europe, and Ezra A. Blount, Editor, "Products Finishing", evaluate plating in Japan, Formosa and other Asiatic countries.

The Educational Session followed a large reception and luncheon given to members of the Chicago Branch and other guests by The Udylite Corporation of Detroit. Also held earlier that day were meetings not only of the AES Midwest Regional Council Board, with its Chairman Leslie L. Diveley presiding, but also of the AES Milwaukee Convention (1962) Educational Committee headed by Chairman Joseph Andrus.

A highlight of the Branch's Educational Session was the presentation in absentia of a laminated scroll to octogenarian H. A. Gilbertson signifying election to Chicago Branch Honorary Membership. Introduced by Branch President Matt Dassinger, the actual presentation was made by Past Branch President R. Scott Modjeska and was received in behalf of ailing but recovering AES Past National President Gilbertson by Board of Manager's Chairman Charles Geldzahler and Branch Secretary-Treasurer, Paul Glab.

Following a delightful cocktail party jointly hosted by a large number of the member companies of the Metal Finishing Suppliers' Association, the throng of Chicago Branch members and their guests dined heartily at the event's Banquet in the Grand Ballroom, then viewed and enjoyed a floor show, and then danced to an early morning hour.

MIDWEST REGIONAL COUNCIL PLANS THIRD ANNUAL CONFERENCE

At its Annual Meeting in Chicago on Saturday, January 28, the Midwest Regional Council completed plans for its Third Annual Conference, which will be held on Saturday, October 28 at the Argonne National Laboratory near Chicago.

Clyde Kelly and Dr. Jay Monaweck are general co-chairmen and are arranging an unusually significant meeting for the Midwest members. In addition to the educational features to be offered at the Conference, those attending will have the opportunity to see the atomic reactors, the "swimming pool" and the "hot laboratory."

The educational program for electroplaters will consist of a symposium on the subject of "Plating Upon Uncommon Bases." As before, workshop sessions will be held for organic finishers and people in the mechanical finishing field. The Educational Committee will consist of R. Scott Modjeska, chairman, E. H. McCoy, Dr. Ernest J. Wilhelm, S. P. Gary, Dr. Russel E. Harr, Thomas McCullough, Dr. J. H. Monaweck, Lloyd Gilbert and Dr. Ernest H. Lyons.

In addition to planning its next conference, the Council also discussed methods of mutual assistance in the fields of educational programming, Sustaining Membership solicitation, meeting date clearance, and membership drives.

Herman Tessmann, general chairman, and Joseph Andrus, educational chairman, reported the status of organization work for the 1962 AES Milwaukee Convention. The following were elected to serve as officers for the coming year: Leslie L. Diveley, chairman; Dr. Harold J. Weisner, vice-chairman; Paul Glab, secretary. The next meeting of the Council will be held in Milwaukee, Saturday, April 29.

LIFT! HELP YOUR BRANCH ATTAIN ITS MEMBERSHIP EXPANSION GOAL

International plating was the educational subject treated at the Chicago Branch Annual Meeting, January 28, by Myron B. Diggin (Europe) at right and Ezra A. Blount (Far East) at left. Branch Librarian Simon P. Gary, center.

THE AES MIDWEST REGIONAL COUNCIL IN MIDWINTER MEETING

The Delegates of Chicago, Milwaukee, St. Joseph Valley, St. Louis and Rockford Branches in session at Chicago, January 28, Chairman Leslie L. Diveley presiding.

RESEARCH COMMITTEE LAUNCHES PROJECT ON PLATING BY THERMAL DECOMPOSITION

Plans to launch the first phase of the American Electroplaters' Society (AES) Research Program's new Project No. 20 within the immediate future were among the highlights of the meeting of the AES Research Committee that was held at the Conrad Hilton Hotel, Chicago, Illinois, January 27, 1961, with Chairman D. G. Foulke presiding.

Focussed upon the subject of "Plating by Thermal Decomposition—Vapor Deposition" and directed by the Project No. 20 Committee of the AES's Dallas-Fort Worth Branch, with Myron E. Browning and William L. Aves Jr., as Co-chairmen, the first phase will embody literature search and coordination before programming and proceeding with later concentrated fact-finding.

The Research Committee also reviewed the status and progress of each of the AES Research Program's six other 1960–1961 Projects with Dr. Harold J. Wiesner, its Vice Chairman for Research. It also discussed at length, the report brought to the meeting by Walter E. Moline, Chairman of its Subcommittee on New Projects, and heard the status reports of respective Task Committees that, under Mr. Moline, are exploring the eligibility of a number of additional subjects for future Project status. It thus paved the way for action at its April 1961 meeting at which the 1961–1962 AES Research Program and its component Projects will be finalized, subject to ratification at its Annual Meeting to be held at the Boston Convention, June 21, 1961.

It was announced at the meeting that the publication of Serial Report No. 45 ("The Effect of Soils on Overpotential and the Kinetics of Electrodeposition of Metals") was near at hand, and that copies of it would go to the Research Committee's usual wide AES distribution list, including all Sustaining Members.

As regards increase of the number of AES's Sustaining Memberships, Vice Chairman for Finance Raymond L. Mitchell called attention to the progress of the Society's accelerated 1960–1961 Sustaining Membership Expansion Program under pinpointed Branch and Regional direction. At year-end 1960, the Society had 349 such Sustaining Memberships compared with 331 at year-end 1959.

The meeting also heard, with satisfaction, of the progress of its Conference Committee headed by August Mendizza in readying its two-day AES Research Conference that will be held at the Bell Telephone Laboratories, Murray Hill, N.J., April 24–25, 1961, to be attended by members of the Research Committee, its District Supervisors, its Regional Research Finance Chairmen, its respective Project Chairmen and Project Directors, ranking members of Sustaining Member companies and former Research Committee Chairmen.

Other members of the Research Committee present at this Chicago meeting were Dr. B. B. Knapp, Edward J. Kubis, John P. Nichols, Whitney Snyder and, by invitation, District Supervisor Clyde Kelly.

H. A. Gilbertson

OLDEST NATIONAL PRESIDENT HONORED BY CHICAGO BRANCH

The oldest living Past National President of the American Electroplaters' Society, H. A. Gilbertson of Chicago, already an AES National Honorary Member, was honored by the Chicago Branch recently by being voted an Honorary Member of that Branch which he headed so many years ago.

Now recuperating from a recent illness, the octogenarian, still a familiar figure at National Conventions and at Chicago Branch Annual Meetings, was presented with a plaque in absentia at the Branch's 49th Annual Educational Session and Banquet held at the Conrad Hilton Hotel, January 28. He was National President of the Society in 1934–1935.

AES and its PLATING MAGAZINE extend congratulations to Mr. Gilbertson, and their best wishes for his early full recovery.

AES LAPEL BUTTONS

The AES member's handsome sterling silver lapel button can be purchased from your Branch Secretary at $1.38 per button including tax. These, in turn, can be purchased by Branch Secretaries from National Headquarters at that amount. The silver Branch Past President's button can be purchased by Branch Secretaries from the National Office at $1.43 per button including tax.

For cleaning these sterling silver buttons, here is one expert member's reported method, "Place hot water in which a little washing soda has been dissolved into an aluminum pan or any container with a small piece of aluminum at bottom (concentration: one tablespoonful of soda to one quart of water). Immerse the button so as to touch aluminum, and allow to soak until tarnish disappears. Operation will clean but will not injure the silver."

VERSATILE EDUCATIONAL PROGRAM PLANNED FOR NEW ENGLAND REGIONAL MEETING

On April 22, 1961, the Twenty-Second Annual New England Regional Meeting of the American Electroplaters' Society will be held at the Hotel Statler-Hilton in Hartford, Connecticut.

At 2:00 p.m. the educational chairman, Alexander R. Salmond, will open the technical session with the introduction of Alexander Korbelak, vice president of Sel-Rex Corporation of Nutley, New Jersey. Mr. Korbelak will deliver a paper entitled "New Industrial Applications for Precious Metal Coatings."

The second speaker will be Ralph E. Pettit, technical advisor, Metal Industry Department of Diversey Corporation, Chicago, Illinois. Mr. Pettit will deliver a paper entitled "Metal Etching—Functional and Decorative."

Under the direction of Mr. and Mrs. Walter J. Dyber, chairman and chairlady of entertainment, there will be a special Bingo Party for the ladies during the technical session with Bob Boulay as master of ceremonies.

Dining, dancing to the music of William Glenny's orchestra, and intriguing entertainment will round out the balance of the program.

The various committee chairmen are: Harry Taylor, general chairman, New Haven Branch; Alexander Salmond, educational chairman, Springfield Branch; Walter Dyber, entertainment chairman, Hartford Branch; William Hyatt, publicity chairman, Bridgeport Branch; and William Giesker, advertising chairman, Waterbury Branch.

HOTEL RESERVATION FORM
48th ANNUAL CONVENTION
AMERICAN ELECTROPLATERS' SOCIETY, INC.
STATLER-HILTON HOTEL • BOSTON, MASS., JUNE 18-23, 1961

TO FRONT OFFICE MANAGER
THE STATLER-HILTON HOTEL
PARK SQUARE AT ARLINGTON STREET
BOSTON 17, MASSACHUSETTS

Date .....

Your Name .....
(Please Print)

Address .....

City ..... State .....

EXECUTE AND MAIL PROMPTLY

AES Member .....
Yes or No

Reservation will be held only until 6 p.m. on day of arrival unless later hour is specified. Reservation should be mailed promptly, and, in any case, must be received not later than two weeks prior to the opening date of Convention.

Date Arriving ..... Hour ..... A.M. P.M.

Date Departing ..... Hour ..... A.M. P.M.

Room and Bath	10.00 ☐	11.50 ☐	12.50 ☐	14.00 ☐
For One—Per Day	10.50 ☐	12.00 ☐	13.50 ☐	15.50 ☐
Double-Bed Room with Bath		16.00 ☐	17.00 ☐	18.50 ☐
For Two—Per Day		16.50 ☐	18.00 ☐	20.00 ☐
Twin-Bed Room with Bath		17.50 ☐	19.00 ☐	20.00 ☐
For Two—Per Day		18.50 ☐	19.50 ☐	21.00 ☐

More Than Two Persons in One Room:
For each additional person in Double or Twin-Bed Room, the extra charge is $4.00 per day.

SUITE—Living Room, Bed Room and Bath—Per Day

For One or Two Persons:	38.50 ☐	39.00 ☐	40.00 ☐	41.00 ☐	43.50 ☐

If a room at the rate requested is unavailable, one at the nearest available rate will be reserved.

BOSTON CONVENTION QUESTIONS AND ANSWERS IMPORTANT TO YOU

I WHERE WILL NEXT CONVENTION BE HELD?

AES's 1961 Convention will be held at the Statler Hilton Hotel, Boston, Massachusetts.

II UNDER WHOSE LOCAL SPONSORSHIP?

The Society's Boston Branch, itself observing its own Fortieth Anniversary as a chartered AES Branch, will serve as Host Branch.

III WHAT ARE ITS DATES?

The Convention will be held June 18-23, 1961.

IV WHAT IS THIS CONVENTION'S SPECIAL IMPORT?

The AES National Convention, having journeyed to Canada in 1957, to America's Midwest in 1958 and 1959, and to the Pacific Coast in 1960, returns to the East Coast of its origin in June 1961. AES's entire New England segment, six Branch strong, is eagerly awaiting its arrival.

V WHAT IS ITS EDUCATIONAL SIGNIFICANCE?

Being the prime purpose of any AES Convention, and so as to stimulate the largest possible AES attendance at this third Boston visit of an AES National Convention in the Society's 52 year life to date, the AES, through its Editorial Board and the Host Branch Convention Educational Committee, has fashioned an outstanding package of educational sessions. Nine such sessions will feature 30 quality technical papers. A highspot will be the "Third Annual William Blum Lecture." It will be delivered by Dr. Charles L. Faust, third winner of the AES Scientific Achievement Award, the Society's highest scientific honor. It will also present a full day's "Finishing of Light Metals" Symposium, supplemented by an evening forum on that same subject.

VI WILL THE LADIES ENJOY ATTENDING?

The Ladies delight in attending AES National Conventions and should certainly enjoy this one. Among Boston Convention pleasures to be remembered will be a Luncheon on Monday, June 19, followed by their voyage along the Bay City's renowned Freedom Trail. They will dance that evening at the MFSA Ball. They will tour the scenic wonders of the North Shore, Tuesday, then lunch at famed Crane's Castle in picturesque Ipswich. They will have "Fun with Fiedler" at the Boston Pops that evening, then "Clambake" in Plymouth the following afternoon. They will enjoy a gala luncheon on Thursday, then observe the cocktail hour with the MFSA before that evening's memorable Farewell Banquet. During unscheduled hours, they will have opportunity to roam—and see—and be seen—and in so many other ways "live a lot" in the so-called "Hub of the Universe".

VII WILL CHILDREN BE ACCOMMODATED?

As did the Washington and Los Angeles Conventions, this June's Boston Convention will cater to AES's youngsters, and will go out of its way to give them fun-filled days. Beamed to fulfill young dreams, the Children's Program will give them a "youth's-eye view" of the Salem-Marblehead Area on Monday, including the "House of Seven Gables", the Witch House, Gallows Hill, Marblehead. During day-time Tuesday, they will really view historic and memorable Boston and nearby Cambridge, including Harvard. They will lunch, in fact, at the Smith House. With their folks, they will Clambake, "Bass Stone"-style, Wednesday afternoon. Then on Thursday, supervised as always, they will pile the decks of a Boston boat and ply the Charles River. They will dock at the Museum of Science and also enjoy the Planetarium Show. If their folks so desire, they can also attend the gala Farewell Banquet of the Convention, and view the delightful floor show that will be a feature of it.

VIII WHAT IS THE ADULT REGISTRATION FEE?

For both male and female adults, the registration fee of the Boston Convention will be $25.00 per person.

IX WHAT IS THE CHILDREN'S REGISTRATION FEE?

The registration fee for each child will be $15.00. This will include transportation, chaperones and lunches. It will not include a banquet ticket. If desired, these can be obtained at an additional $8.50 each. Older registered AES youngsters may even attend the Boston Pops Concert Tuesday evening, if seats become available, at an additional $1.50 per child.

X WHAT SHALL I DO TO GET READY TO ATTEND?

Make up your mind early that you and yours just simply cannot afford to miss this Boston pilgrimage. Then hasten to accomplish and mail the Hotel Reservation Form that you have received from the Boston Branch Convention Committee via AES Headquarters so as to assure yourself of hotel accommodations. Meantime, as our imagined Bostonian said in "Bostonese" in our February 1961 issue, " . . . May no ham, and every good, befall you until we meet in Bass Stone next June. And off-ta you have left Noon Gland, may you of AES look back and hold that it was a top-draw eye dear that motivated you to pick Bass Stone as site of your 48th Annual Convention."

Mrs. George P. Swift
Ladies Chairman

Mrs. George J. Marotta
Children's Program Chairman

TENTATIVE PROGRAM

FORTY-EIGHTH ANNUAL CONVENTION
AMERICAN ELECTROPLATERS' SOCIETY, INC.

STATLER-HILTON HOTEL, BOSTON, MASSACHUSETTS, JUNE 18-23, 1961

SUNDAY, JUNE 18

9:00 a. m.	Executive Board Meeting (All Day)	AES Headquarters Room
1:00–8:00 p. m.	Registration	Mezzanine
2:00 p. m.	Honorary Membership Award Committee Meeting	Room 418
2:00 p. m.	AES Scientific Achievement Award Committee Meeting	Room 410
3:00 p. m.	Ladies Program Tea of Welcome	Georgian Room
4:00 p. m.	Credentials Committee Meeting with Executive Board	Headquarters Room
8:00 p. m.	AES Get-Together Party	Grand Ballroom

MONDAY, JUNE 19

8:00 a. m.-9:00 p. m.	Registration	Mezzanine
9:30 a. m.	Children's Program (Tour of Salem-Marblehead Area, including Luncheon)	Buses from Statler Hotel
10:00 a. m.	Grand Opening Session	Grand Ballroom
11:00 a. m.	Business Meeting Supreme Society	Grand Ballroom
12:00 noon	Branch Secretaries' Luncheon	Parlor A
12:15 p. m.	Speakers' Luncheon	Parlor F
12:30 p. m.	Ladies Luncheon (Followed by Tour of Boston)	Bay State Room
1:00 p. m.	Plant Visit. Keystone Camera Co.	Buses from Statler Hotel
1:00 p. m.	Plant Visit. Boston Globe	Buses from Statler Hotel
2:00 p. m.	Opening Educational Session (The William Blum Lecture)	Grand Ballroom
2:30 p. m.	Editorial Board Meeting	Parlor C
2:30 p. m.	Educational Session A (Research)	Grand Ballroom
	1. Research Committee Chairman's Presentation	
	2. Research Project No. 14—"A Microscopic Study of Chromium Plating"	
	3. Research Project No. 15—"Progess Report on the Development of Corrosion Tests for the Performance of Plated Coatings"	
2:30 p. m.	Educational Session B (Organic Finishing)	Georgian Room
	4. "Functional Vinyls Go Decorative"	
	5. "Overcoming Organic Finishing Problems"	
	6. "New Epoxy Primer-Acrylic Lacquer Finish System"	
4:00 p. m.	Order of Past Presidents Meeting	Hancock Room
6:00 p. m.	Order of Past Presidents Dinner	Hancock Room
8:00 p. m.	MFSA Ball	Grand Ballroom

TUESDAY, JUNE 20

8:00 a. m.	Charles Henry Proctor Memorial Leadership Award Selection Committee Breakfast	Room 418
8:00 a. m.	Speakers' Breakfast	Parlor F
9.00 a. m.–5:30 p. m.	Registration	Mezzanine
9:00 a. m.	Educational Session C (Finishing of Light Metals Symposium)	Grand Ballroom
	7. "Nickel-Chromium Plating Upon Anodized Aluminum"	
	8. "Chemical Conversion Coating for Aluminum Alloys"	
	9. "Outdoor Exposure of Anodic Coatings on Aluminum: Effect of Sealing"	
	10. "The Effect of Voltage During Anodizing of Aluminum"	
9:00 a. m.	Membership Committee Meeting	Room 436
9:00 a. m.	Public Relations Committee Meeting	Room 438
9:00 a. m.	Publications Committee Meeting	Room 437
9:00 a. m.	Educational Committee Meeting	Room 440
9:00 a. m.	Ladies Program (Scenic Tour of North Shore enroute to Ipswich)	Buses from Statler Hotel
9:30 a. m.	Plant Visit. Gillette Safety Razor Co. (1st group)	Buses from Statler Hotel
9:30 a. m.	Children's Program (Tour of Boston and Cambridge. Lunch at Smith House)	Buses from Statler Hotel
12:00 noon	Joint Educational Committee and Branch Librarians Luncheon	Parlor A
12:00 noon	Speakers' Luncheon	Parlor F
12:00 noon	Ladies Luncheon (Castle Hill, Crane Estate, Ipswich, Mass.)	Buses 9 a. m. from Statler Hotel
1:00 p. m.	Plant Visit. Gillette Safety Razor Co. (2nd group)	Buses from Statler Hotel

TUESDAY, JUNE 20 (continued)

2:00 p. m.	**Educational Session D (Finishing of Light Metals Symposium)**	**Grand Ballroom**
	11. "Plating on Magnesium by Electrodeposition and Chemical Reduction Methods"	
	12. "Anodizing or Conversion Coating of Magnesium"	
	13. "Chromic Acid Anodizing of Beryllium" (Part I)	
	14. "Chromic Acid Anodizing of Beryllium" (Part II)	
2:00 p. m.	**Individual AES Regional Council Meetings (If Any)**	**(To be Announced)**
4:00 p. m.	**AES Regional Group and Council Chairmen's Meeting**	**Room 442**
4:30 p. m.	**Finishing of Light Metals Forum**	**Grand Ballroom**
8:30 p. m.	**"Fun with Fiedler" at Boston Pops**	**Boston Symphony Hall**

WEDNESDAY, JUNE 21

8:00 a. m.	**Research Committee Breakfast**	**Hancock Room**
8:00 a. m.	**Speakers' Breakfast**	**Parlor F**
9:00 a. m.–12:00 noon	**Registration**	**Mezzanine**
9:00 a. m.	**Educational Session E**	**Grand Ballroom**
	15. "Quality Control Study to Determine Optimum Conditions for Barrel Plating in Zinc Cyanide Solutions"	
	16. "The Practical Application of Statistics to Quality Control of Electroplated Products"	
	17. "Overcoming the Limitations of Electroforming—A Progress Report"	
9:00 a. m.	**Educational Session F**	**Georgian Room**
	18. "The Anodic Behavior of Metals in Cleaning Media—Copper and Its Alloys"	
	19. "Production Nickel Plating on Molybdenum"	
	20. "Improved Adhesion of Electroless Nickel Plating on Titanium Alloys"	
9:00 a. m.	**Research Committee Meeting**	**Hancock Room**
9:00 a. m.	**Plant Visits. Western Electric Company, North Andover, luncheon at Western Electric plant, afternoon visit at Raytheon Mfg. Co., Andover**	**Buses from Statler Hotel**
12:00 noon	**Speakers' Luncheon**	**(To be Announced)**
1:30 p. m.	**AES Annual Outing (Clambake at Historic Plymouth, Mass.)**	**Buses from Statler Hotel**

THURSDAY, JUNE 22

8:00 a. m.	**Speakers' Breakfast**	**Parlor F**
9:00 a. m.	**Business Meeting, Supreme Society**	**Bay State Room**
9:00 a. m.	**Educational Session G**	**Grand Ballroom**
	21. "Precious Metal Plating and Solderability"	
	22. "Recent Developments in the Use of Electroplating in the Additive Method of Printed Wiring Manufacture"	
	23. "Stoichiometry of Copper Bonding Using Copper Oxide"	
9:00 a. m.	**Educational Session H**	**(To be Announced)**
	24. "Corrosion Current Data for Nickel-Chromium Couples"	
	25. "Dual Chromium Plating of Zinc Die Castings"	
	26. "Objectives in Corrosion Protection of Bright Decorative Trim and Their Implementation"	
9:30 a. m.	**Children's Program (Boat ride on the Charles River. Also tour of Museum of Science and Planetarium)**	**Buses from Statler Hotel**
12:00 noon	**Speakers' Luncheon**	**(To be Announced)**
12:00 noon	**Ladies Luncheon**	**(To be Announced)**
2:00 p. m.	**Business Meeting, Supreme Society**	**Bay State Room**
2:00 p. m.	**Educational Session I**	**(To be Announced)**
	27. "Plating of Printed Circuits with Pyrophosphate Copper and Tin-Nickel"	
	28. "Evaluation of Solderability of Electroplated Coating"	
	29. "Producing Ultra High Frequency Electronic Parts by Electroless Copper and Precious Metal Plating of Plastics"	
6:00 p. m.	**MFSA Cocktail Party**	**Georgian Room**
7:00 p. m.	**AES Farewell Banquet**	**Grand Ballroom**

FRIDAY, JUNE 23

8:00 a. m.	**President's Breakfast to National Officers and their Families**	**Parlor C**
9:00 a. m.	**Executive Board Meeting**	**AES Headquarters Room**

(This is a TENTATIVE PROGRAM as of February 1, 1961. Additions and modifications will be made monthly until finalized.)

INTERSOCIETY NEWS

CONFIDENCE EXPRESSED IN WESTERN METAL SHOW

Top staff associates of American Society for Metals are expressing confidence that the 12th Western Metal Congress and Exposition, March 20–24, in Los Angeles, will deliver a greater educational impact to metalworking in the West than any of the dual event's predecessors.

Allan Ray Putnam, managing director of the Society, asserts present metalworking problems in the area have been given top priority among technical papers at the sessions and displays in the Exposition. All Congress sessions will be in the Ambassador Hotel. The exhibits will be in Pan-Pacific Auditorium and adjoining pavilion.

At latest count, products of 287 firms dedicated to metalworking will be represented in the spacious exhibit hall and pavilion, according to Putnam. These will be concentrated in 194 exhibits (as of January 27). This number is expected to exceed 200 by show time.

No charge will be made to attend technical sessions of the ASM Metal Congress, Putnam says. At the same time, ASM has distributed thousands of admission-invitations throughout the West entitling qualified metals engineers and others engaged in top metalworking activities to register without fee.

♦

NEW MATERIALS HIGHLIGHT PLASTICS MEETING

A new method of crosslinking furfuryl alcohol resins to produce an improved type of coating was detailed in a paper presented January 24 at the 17th Annual Technical Conference of the Society of Plastics Engineers in Washington, D. C. Erik R. Nielsen of the Armour Research Foundation of Illinois Institute of Technology told plastics engineers that use of polyfunctional amides, amines and amino acids as crosslinkers, rather than the usual strong acids, resulted in a more flexible resin with excellent adhesion properties.

According to Mr. Nielsen, it is necessary that commercial resins currently produced by treatment of furfuryl alcohol with strong acids contain considerable quantities of unreacted alcohol in order to obtain a stable material. If this excess acid is not neutralized, corrosion becomes a problem and the resin first becomes rubbery and then turns black, hard and brittle.

While the use of various amino acids as the crosslinking agent violates theory, it results in a resin which deteriorates at a much slower rate, is flexible and adheres well to both steel and copper.

In another paper entitled "Properties of a New Polyester Film", M. T. Watson of Tennessee Eastman Company revealed the application of an existing linear polyester to the production of film. While the polyester itself has been on the market for some time, its extrusion as a strong, clear film opens up broad applications in the packaging field. The new film is resistant to chemicals and extremely stable. Although it is available at present in pilot plant quantities, full scale production will be initiated in the near future.

Yet a third paper by three members of the staff of Union Carbide Plastics Company details development of a high temperature polymer which "will make possible applications which were formerly beyond the reach of existing plastics materials." This new phenolic is ideal for applications in the missile and high-speed aircraft industries and for replacement of heavier ceramic and metal parts. Adaptable to various types of molding, the material is considerably less expensive than other plastics materials capable of somewhat similar services. Field trials are currently underway to test properties of the material.

♦

ASTME AND AAAS NOW AFFILIATED

Two organizations that have made contributions to basic science and to the application of that science for greater American productivity have joined forces. The 40,000 member American Society of Tool and Manufacturing Engineers has become affiliated with the American Association for the Advancement of Science, one of the oldest and largest associations of scientists in this country.

In announcing the affiliation, Harry E. Conrad, ASTME general manager said: "The affiliation of ASTME with AAAS simply serves to emphasize the growing link between so-called "pure" science and the engineering sciences. With today's accelerating rate of development in both science and engineering, only a few months may separate the conception of an idea by a scientist and the realization of that idea in terms of a practicable engineering design."

♦

SPE SECTION TO SPONSOR WORKSHOP

Continuing the successful SPE educational Workshops, the Pioneer Valley Section of the Society of Plastics Engineers will sponsor a two-day Workshop or "refresher course" in injection molding on April 4 and 5, at Holy Cross College in Worcester, Massachusetts. Technical program of this regional technical conference will present fundamentals of both theory and practice of injection molding. Developed with the cooperation of SPE's injection molding professional activity group, this program comprises informal classroom lectures by leading experts followed by panel discussions geared to audience participation.

♦

SPE EDUCATIONAL EXHIBIT WILL BE SEEN IN 16 CITIES

First educational and technical traveling exhibit of the Society of Plastics Engineers, centered about the theme, "Plastics—A New Dimension in Buildings," has been announced. Opening in Springfield, Massachusetts on April 15, 1961, the exhibit will travel to some 16 major North American cities for 30-day showings during 1961–1963.

This educational exhibit is designed to disseminate technical information to architects, builders, contractors, interior designers and students in these professions. Among the cities where the educational exhibit will be shown in museums or universities are New York, Washington, Minneapolis, Dallas, Seattle, Los Angeles, Birmingham, Memphis, Columbus and Toronto.

The technical exhibit will include some 30 individual units devoted to the use of plastics in buildings.

Four American Society for Metals staff members who completed advance planning for the ASM Materials Comparison Center of the 1961 Detroit Metal Show, October 23-27 in Cobo Hall, Detroit. Clockwise from top left, T. C. DuMond, manager of Metal Congresses and editor of *Metals Review;* Dr. Taylor Lyman, editor of the new Metals Handbook; Dr. Allen G. Gray, editor of *Metal Progress;* and Dr. Anton deS. Brasunas, head of the Metals Engineering Institute.

PATENT ABSTRACTS

DR. D. GARDNER FOULKE
SEL-REX CORPORATION
Nutley, New Jersey

Copies of patents may be obtained by writing to Commissioner of Patents, Washington, D. C. Price 25 cents each.

2,955,967, 10/11/60—PHOSPHATIZING—B. Blaser and E. Mayer, assignors to Amchem Products Inc., Ambler, Pa.

A heavy-metal phosphatizing solution containing as an addition agent, from 0.1 to 10 grams/liter of a water-soluble salt of phosphoric acid having a *p–p* bond in which the oxidation number of a phosphorous atom is less than five.

6 claims.

♦

2,956,900, 10/18/60—NICKEL COATING COMPOSITION—A. Carlson and C. Prymula, assignors to Alpha Metals Laboratories, Inc., Chicago, Illinois.

Claim 1 states: A process of coating a surface with nickel which comprises spraying separately and directing toward the surface so that the solutions converge on the surface a nickel solution and reducer solution, said nickel solution consisting essentially of a nickel salt, selected from the group consisting of nickel sulphate, nickel chloride, and nickel formate; water, and citric acid in a molar ratio of nickel sulphate to citric acid of between approximately 1.3 and 2.0, and a molar ratio of such other nickel salts to citric acid of between approximately 1.3 and 2.85 and said reducer solution consisting essentially of an alkaline solution of sodium hydrosulphite and sodium hypophosphite, the molar ratio of sodium hydrosulphite to sodium hypophosphite being approximately 1.40 and 3.53.

See also 2,956,901 describing a similar copper coating process with 6 claims.

4 claims, figure.

♦

2,956,906, 10/18/60—ENAMELED SHEET STEEL—D. Blickwede, et. al; assignors to Bethlehem Steel Co., Bethlehem, Pa.

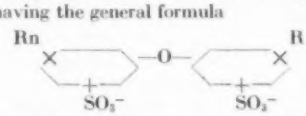
A steel of 0.0175 carbon and manganese to 0.50 per cent Mn is excellent for vitreous enameling.

15 claims, figure.

♦

2,956,935, 10/18/60—CHROMIUM PLATING—F. Passal, assignor to Metal & Thermit Corp., Woodbridge Township, N. J.

An anti-misting agent for a chromic acid plating bath is described as having the general formula



Where R is an alkyl of 6–18 carbon atoms and *n* is an integer of value to 0 to 1.

15 claims.

♦

2,956,943, 10/18/60—PLATING APPARATUS—R. Hoegh, assignor to Mercil Plating Equipment Co., Chicago, Ill.

A plating barrel to provide easy filling and emptying is described.

9 claims, figure.

2,957,782, 10/25/60—COATING FERROUS METALS—E. Boller, assignor to Boller Development Corp., Marion, Ind.

Claim 1 states: A process for coating ferrous metal which consists in the steps of cleaning the surface of the work to be coated, then plating the work, in a fused chloride bath which consists of ammonium chloride and at least two chlorides selected from the group consisting of the chlorides of zinc, sodium, potassium, lithium, calcium, magnesium and barium at a temperature between the melting point of the bath and about 650C, with a non-ferrous metal having a solubility in liquid aluminum not exceeding 8 per cent by weight at 700C, said bath being substantially water-free and oxygen-free and including the chloride of the metal to be deposited on the work in an amount between 0.2 per cent and 3.0 per cent of the mass of the bath, then cleaning heavy metal salts from the work by immersing the work in a bath consisting of fused alkali chlorides, and which is free of heavy metals, and then dipping the work in a molten metal bath whose major constituent is aluminum.

18 claims, figure.

♦

2,957,812, 10/25/60—COLORING STAINLESS STEEL—R. Bongartz and J. Beigay, assignor to Allegheny Ludlum Steel Corp., Brochenridge, Pa.

Treat a stainless steel with at least a No. 2 finish with an alkali metal hydroxide at 60F to boiling, making the anode and passing a 1/8 to 2.0 asf current through the part and solution.

1 claim.

♦

2,857,813, 10/25/60—DETARNISHING SILVERWARE—R. Reinert, assignor to General Electric Co., New York.

Contact the silver articles with an aluminum or magnesium anode in a tripolyphosphate solution.

See also silverware buckets for dishwasher by R. Wales, assigned to General Electric, 2,957,817 with 5 claims.

7 claims, figure.

♦

2,958,120, 11/1/60—FLUSH CIRCUIT—D. Taylor, assignor to I.B.M., New York, N. Y.

Print one side of a copper laminate with resist and on the other side print the negative of the circuit. Etch away the metal, then press the metal remaining flush with the plastic.

2 claims, figure.

♦

2,958,147, 11/1/60—CHEMICAL MILLING APPARATUS—F. Monahan, assignor to General Dynamics Corp., San Diego, Calif.

A shield for chemical milling is described.

8 claims.

♦

2,958,330, 11/1/60—CONVEYOR—E. Huenerfauth, assignor to Crown Rheostat & Supply Co., Elk Grove Village, Ill.

A dye or plating conveyor having a lift for each carrier is claimed.

20 claims, figure.

♦

2,958,331, 11/1/60—PLATING CONVEYOR—D. Borodin, assignor to Allied Research Products, Inc., Baltimore, Md.

An automatic plating machine is described.

32 claims, figure.

♦

2,958,610, 11/1/60—PRE-PLATE TREATMENT OF ALUMINUM—E. Ramirez and E. Barkman, assignors to Reynolds Metals Co., Richmond, Va.

Prior to chemical nickel plating aluminum, etch, then rinse in a ammoniacal solution containing aminocarboxylic acids, hydroxycarboxylic acids or salts of the acids.

9 claims.

♦

2,958,633, 11/1/60—MANUFACTURE OF SEMI-CONDUCTOR DEVICES—B. Clausson, assignor to International Standard Electric Corp., Delaware.

(*Continued on page 308*)

INDUSTRY NEWS

COWLES CHEMICAL CONSOLIDATES OPERATIONS

Cowles Chemical Company, Cleveland, Ohio, officially consolidated the operations of its metal finishing products department with the recently acquired Promat Division at a week-long December meeting in Waukegan, Illinois. Personnel and territory assignments were made effective January 1, 1961. Use characteristics of the company's products were demonstrated under production conditions in the pilot plating plant, after which each man produced finished parts by running them through complete cycles.

Carlton C. Clabaugh, department manager, announced the following organization outline: William J. Stark, sales manager, sales representatives and headquarters; Milton Pascal, New York; George Wolebeu, Buffalo; Elmer Lord, Cleveland; Clay Sayers, Cincinnati; James Goas, Indianapolis; William Swift, Detroit; George Egger, Chicago; Alexander Alexander, Rockford; Ernest Banner, Minneapolis; George Olbur, Los Angeles; technical service, Russell Miller and Marvin Siddall.

Production facilities of the Promat Waukegan plant will be moved to Cowles new plant in Joliet, Illinois, early this spring. Service laboratory and pilot plating plant equipment will also go to Joliet. A second service laboratory for eastern customers will be established at the existing Skaneateles Falls laboratories. Order processing, credit and accounting will become part of Cowles' headquarters function in Cleveland.

AUTOMOBILE CORROSION AND ROCK SALT

Concern for the corrosion damage to automobiles in the winter by rock salt used to remove ice and snow from the streets caused the Detroit Free Press recently to look into the problem and to subsequently publish a report.

That newspaper reportedly learned that in a study made by the Engineering Society of Detroit, the researchers concluded, "So far rock salt is the only really effective method to actually remove the ice."

As to effect on automobiles . . .

"There is no doubt," the study reports, "that metals exposed to salts will corrode more rapidly than metals not so exposed.

"Nor is there any doubt about the fact that there are many things besides salts that accelerate corrosion of automobiles.

"For example, in the Detroit area, chlorine and sulphuric acid fumes cause comparatively rapid deterioration of chromium-plated parts."

Antidotes reportedly suggested by the Salt Institute include frequent car washing and flushing off packed mud and ice, retouching paint and undercoat, and dry storage.

♦

READERSHIP AWARD

Their advertisement captioned "Nose Cones Plated with Sel-Rex Bright Gold Recovered from Space Orbits," has won First Award for Highest Readership Score, for Sel-Rex Corporation, Nutley, New Jersey, in a special survey conducted by *Electronic Design* magazine.

According to a Sel-Rex spokesman, the advertisement which told of the historic mid-air catch of the Discoverer XIV space capsule, scored 50 per cent higher readership than the average of all other full-page advertisements in the magazine surveyed.

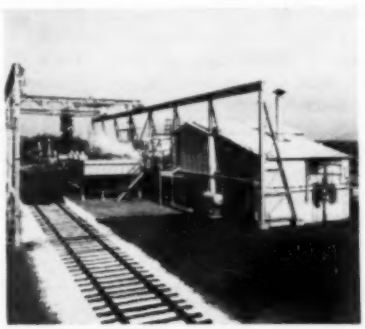
In addition to an actual photograph taken from the C-119 recovery plane, the award-winning advertisement featured a photograph of ex-President Eisenhower holding the American flag which was in the recovered capsule during its flight through space. Permission to use the latter photograph was reportedly received by letter directly from ex-Presidential Press Secretary Jim Haggerty.

Sel-Rex won a first award for Highest Readership Score in the same competition previously in 1959 for their advertisement which told of the original United States IGY Earth Satellites, launched from Patrick Air Force Base in Florida.

♦

METAL & THERMIT'S DETINNING PLANTS

Metal & Thermit Corporation officially opened its new half-million-dollar detinning plant in Tampa on January 31. The 11-acre plant site is situated east of the city in the Summit Corporation Industrial Park, on Route 301, just north of Route 60.



Construction on the new plant was begun last August. The installation is now ready to serve industry in Florida and neighboring states.

The plant will use a modern chemical process to recover tin from tin plate scrap. Because the United States is almost entirely dependent upon imports of tin to fill its needs, reclamation of this basic metal through detinning operations serves as important function.

Plans to construct Canada's first detinning plant at Hamilton, Ont., have been announced by H. E. Martin, president, Metal & Thermit Corporation. Ground was scheduled to be broken about February 15. This new facility, which will represent an investment of approximately $1,000,000, will be built and operated by the company's Canadian subsidiary, M&T Products of Canada Ltd.

INDUSTRY NEWS BRIEFS

GOVERNMENT PRELIMINARY REPORT ON NICKEL IN 1960

Consumption of nickel in 1960 is expected to be slightly less, imports appreciably less, and domestic primary nickel production about the same as in 1959 with exports showing a marked increase, according to the Bureau of Mines, U. S. Department of the Interior. Free World production of nickel is expected to have increased to 270,000 tons in 1960.

Consumption of nickel in the first quarter of 1960 was 69,742,000 lb, in the second quarter 53,432,000 lb, a drop of 23 per cent due mainly to lessened demand for nickel for stainless and other steels, high temperature and electrical resistance alloys, electroplating, ceramics and magnets. In the third quarter consumption was 20 per cent less than the second quarter at 42,533,000 lb due mainly to a further drop in nickel requirements for the items given above. The total consumption for the first nine months of 1960 was 165,707,000 lb, 98.5 per cent of the 1959 demand.

It is estimated that the final quarter of 1960 will show an improvement bringing the total consumption for the year to slightly less than the 225 million lb of 1959.

♦

ELECTROPLATING ARTICLE IN TIN PUBLICATION

The latest issue of "Tin and its Uses" gives some space to photographs taken during the visit of H. R. H. The Duke of Edinburgh to the Institute's Headquarters and Laboratories at Perivale, Middlesex, England on October 28, 1960.

There is also an article on the value of employing both zinc and tin together as electroplated coatings upon steel exposed to severe weather conditions. The publication is available free of charge from the Tin Research Institute, Inc., 492 West 6th Ave., Columbus 1, Ohio.

♦

PRECISION METAL PROCESSING TO EXPAND

Formation of Precision Metal Processing Company, incorporating as a division, Kold-Lube Coaters Inc., has been announced by Earnest Harwell, president of the Cleveland-based firm.

The expanded Precision Metal Processing Company offers metal processing facilities for manufacturers, die makers, fabricators and metal stampers. Precision Metal Processing Company is headquartered in a modern, 50,000-sq ft building at 4010 East 116th Street in Cleveland.

♦

INTERNATIONAL SILVER BUYS DRYCOR FELT COMPANY

The International Silver Company has acquired the Drycor Felt Company, Inc., Staffordville, Conn., according to Craig D. Munson, president of the silverware manufacturer.

The Drycor Felt Company, Inc., a Connecticut corporation with plants at Staffordville and Rockville, originally was incorporated in New Jersey in 1935. It manufactures industrial and paper makers' felts, being the pioneer in making felts by the use of a needling process.

"Purchase for cash of Drycor" explained Mr. Munson, "is another step in our continuous diversification program which is designed to broaden the base of our business. Up to now all of our diversification moves have put us into a variety of markets quite different in character from that of silverware."

♦

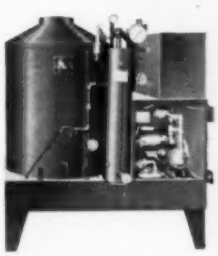
G. I. C. APPOINTED DISTRIBUTOR FOR NEW CARBORUNDUM LINE

Geoscience Instruments Corporation has been appointed a distributor of The Carborundum Corporation. G. I. C. will shortly introduce a new line of abrasives and supplies for precision surface work.

MALSBARY STEAM

heats 40° F. higher, 2 hours faster; cuts fuel costs 20-30%

After switching from open-flame gas burners to a Malsbary 15 bhp steam generator to heat its 10 tanks (2000 gals.), Houston Electro-Plating Co. reports: "Malsbary flash-type coil produces steam at about 300° F. and 10 psig within 2-3 minutes... wastes no fuel keeping tanks hot overnight. We heat solutions to 40° F. higher, two hours faster, at 20-30% less fuel cost. It's also considerably cleaner, more comfortable, especially in summer, and safer—keeps our insurance premiums down."



Easy to Install and Care For. Houston Electro-Plating made their own installation—so can you. The 15 bhp model shown is a space saver, too, requiring only 30" x 48" floor area. Coil-type construction does away with costly re-tubing, and shutdowns for official inspection.

From **$740.00** return system included

Low initial cost. 5, 10, 15, 30 bhp sizes. For further details mail coupon now.

MALSBARY STEAM GENERATORS SINCE 1921

Malsbary Manufacturing Co., 845 - 92nd Ave., Oakland 3, Cal.

SG-9

Malsbary Manufacturing Co.
845 - 92nd Ave., Oakland 3, Calif.

Please send details on Malsbary steam for plating shops.
I am ☐ plater; ☐ dealer; ☐ mf's rep.

Name_____ Title_____

Company_____

Address_____

USE READER SERVICE CARD; INDICATE A 325.

PATENT ABSTRACTS

(Continued from page 305)

Clean the semiconductor electrolytically in a solution of copper chloride in formamide free of oxygen, then reverse the current and plate copper on the semiconductor.

3 claims.

♦

2,958,642, 11/1/60—RACK—William E. Belke, assignor to Belke Mfg. Co., Chicago, Ill.

A plating rack is described.

1 claim, figure.

♦

2,958,928, 11/8/60—PRINTED CIRCUIT—L. Bain and R. Geshner, assignors to Western Electric Co., New York, N. Y.

A method of making printed wiring circuits including a gold plating step is claimed.

1 claim, figure.

♦

2,959,494, 11/8/60—ALUMINUM COATING STEEL—G. Shepard, assignor to Republic Steel Corp., Cleveland, Ohio.

Claim 1 reads: The method of preparing a ferrous metal surface for vapor deposition of an aluminum coating which comprises treating the surface with an acid solution to remove impurities, passivating the acid cleaned surface with an alkaline solution to produce an elemental surface, wiping the elemental surface and squeezing and blowing the surface to dryness without oxidation for the deposition thereon of a coating of aluminum from a vapor of aluminum in a vacuum.

6 claims, figure.

♦

2,959,503, 11/8/60—TREATING TITANIUM—J. Lindson, assignor to National Lead Co., New York, N. Y.

To protect titanium during metal processing operations, cover with a glass frit, process at 700C to 1000C, then remove the glass.

4 claims.

♦

2,959,899, 11/15/60—BUFFING APPARATUS CONTROL SYSTEM—E. Eger, assignor to Western Electric Co., New York, N. Y.

A control system for a buffing apparatus having a buffing wheel moved in accordance with buffing pressure and a cyclically operated buffing compound applicator gun.

5 claims, figure.

A fast inexpensive way to clean your plating racks

SIMPLE, AIR OPERATED TOOL
Adjustable . prevents rack injury

INGERSOLL RAND

Does not hammer until anvil touches the metal .. then strips the metal in seconds.

$60.00

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Rhodium

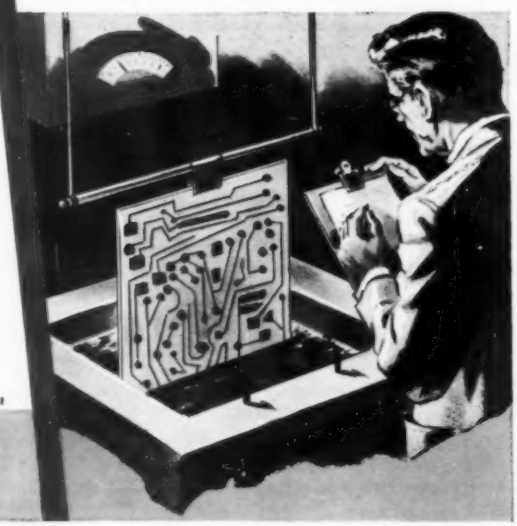
ELECTROPLATING SOLUTIONS

Backed by 60 Years of Specialization

Rhodium electroplate is suggested for these applications: on wave guides and microwave equipment which may be used in marine atmosphere; in printed circuits; in electrical contacts where light contact pressure and low voltages are involved... Rhodium is very hard and corrosion-resistant.

This Rhodium plating solution is easy to use. It operates over a wide range of temperatures and current densities. We will be glad to plate samples without charge.

Consult our staff about plating problems.



SINCE 1901

SIGMUND COHN MFG. CO., INC.
121 SOUTH COLUMBUS AVE. MOUNT VERNON, N.Y.

TRADE LITERATURE

(*Continued from page 258*)

Even intricate parts, especially those with holes, are said to be quickly stripped without danger of etching. Stripped parts are in perfect condition for replating immediately, although brass or copper surfaces will develop a slight tarnishing of the surface which can be easily removed in a short acid or cyanide dip.

L—307. POLISHING AND BUFFING MACHINES—Eight basic types of automatic polishing and buffing machines produced by the Packer Machine Co. are described in a new illustrated folder offered free by the manufacturer.

The machines are of the rotary indexing, continuous rotary, horizontal conveyor and straight line conveyor type. Information on each of the units includes the number of heads available, work table or conveyor size, number of work holding spindles, production rate output and the type of work piece each machine is best suited to handle.

L—308. FILTER SYSTEMS—One-page Bulletin 551A contains complete technical description and prices of the "submerged" leak-proof filter systems for precious metal plating solutions, corrosive liquids and sensitive solutions, capacities from 5 to 100 GPH manufactured by Sethco Manufacturing Co.

In-Tank space required for the filter chamber is only 3½ in. in diameter. An immersion depth of 3 in. is required for optimum depth filtration and agitation of the solution.

Low first cost, trouble free performance and space economy are features offered by the submerged filter systems.

L—309. CHROMATE ANALYSIS—Automatic determination of chromates is described in a new 2-page methodology sheet available from Technicon Controls, Inc.

The complete chemical methodology is detailed for the rapid determination of chromates down to parts per million using the Technicon AutoAnalyzer, an electronic analytical instrumentation system which requires no supervision. A flow diagram of the analytical system is included, together with the actual chart recordings derived.

L—310. BARREL FINISHING—A brief new folder summarizing the complete line of Baird barrel finishing units and replacement barrels is available from the Barrel Finishing Equipment Division, The Baird Machine Company.

Each of the 7 basic units in the Baird line are illustrated and described, in brief "thumbnail" paragraphs. 6 basic types of replacement barrels are handled in the same manner.

L—311. TANKS—Maintenance and replacement cost of plating tanks is claimed to be greatly reduced in the use of Jalco fiberglass tanks, recently introduced by Jalco Tank Company. The new glass reinforced plastic resins are not affected by rust, corrosion or pitting either on the inside or outside of the tanks, adding many years of additional life. The units are available in sizes ranging from 18 in. to 25 ft long, are said to be structurally engineered and sturdily constructed for practical shop use.

A free catalog listing more than fifty sizes of fiberglass tanks and their prices is available.

L—312. ACID INHIBITOR—A new hydrochloric acid inhibitor, Atcor HC, has been developed by Atlas Powder Company for use in pickling and acid cleaning applications.

It is an isopropanol solution of a complex, high molecular weight amine blend which forms an organic film on metallic surfaces and prevents the hydrochloric acid from reacting.

The new product, its uses and application are described in a bulletin from Atlas.

L—313. BARREL FINISHING—A new eight-page booklet "Considerations in the Evaluation of Vibratory Finishers" has been made available by Vibraslide, Inc. It contains information on barrel finishing and data on the newer vibratory-rotary type of finishing.

L—314. INFRA-RED OVEN—A new, multi-color, eight-page folder on fused quartz radiant ovens has just been released by The Cleveland Process Corp. The folder is illustrated with photos of "on the job" applications as well as line drawings, graphs and charts.

A comprehensive price list is included, enabling the buyer to order any model with the correct specifications. One page deals with all the various applications of the Clepco quartz ovens. Other pages are devoted to performance data, wave lengths for proper energy distribution, etc., various baking and curing problems with timing, for particular jobs.

L—315. STRIPPING COMPOUNDS—New metal stripping compounds that effectively strip electroless nickel coatings from steel, magnesium base alloys, nickel phosphorous, copper, brass and copper base alloys by immersion only are fully described in a new series of Technical Data Sheets, No. 119, 120 and 121, prepared by MacDermid Incorporated.

Called Metex Stripper IN-SP, IN-S, IN-CA and IN-CB, the products are in dry powder form which are dissolved in water to remove electroless nickel coatings, one of the most difficult to remove because of high amorphous structure, high phosphorus content and great thickness of deposit.

BOOKS

Remittance must accompany all book orders placed with AES Headquarters.

CATHODIC PROTECTION, by John H. Morgan. 319 pp. Non-members, $12.00; AES members, $10.25.

Although the concept of cathodic protection is old, the practical application has not been as widespread as deserved. This is understandable, the reviewer feels, due to an incomplete understanding and appreciation of the complexities of the factors involved in its application.

For as important a subject as this is, there has been a singular lack of material available having a general approach to the application of cathodic protection in the field. This book fills a definite need, therefore, in bringing together the many facets involved in the protection against corrosion by the application of a cathodic potential to the structure.

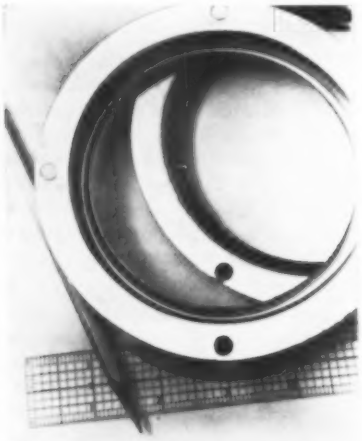
The first three chapters of this book cover general electrochemical background. These are followed by a chapter each on the two methods of cathode protection, viz., sacrificial anodes and impressed current. The chapters following cover specific methods for protection in soils, i.e., buried structures, in sea water, structures containing electrolytes and protection against stray currents. The two final chapters deal with instruments and measurement techniques useful in determining cathodic protection needs and the economics of cathodic protection. Although the last chapter deals with British monetary units, it is nevertheless useful as a guide in evaluating the economics of cathodic protection. The coverage of this material is thorough with particular emphasis on the applications.

There is much in this book which can be useful to the plater. Certainly, exterior and interior corrosion of tanks and equipment is no stranger to him. From the reviewer's experience, the effect of stray currents is a major factor in this problem. Most plating shops try to guard against corrosion by barrier methods; frequent painting and coating of equipment. However, even this is not completely satisfactory. It is, therefore, natural to ask whether stray currents could not be judiciously applied to protect rather than destroy.

A. M. Max
Radio Corporation of America
Indianapolis 1, Indiana

EQUIPMENT AND SUPPLIES

E—301. ZINC PLATING BRIGHTENER—A new liquid brightener for zinc plating baths has been developed by the electroplating research staff of Metal & Thermit Corporation. Identified as M&T Zinc Brightener 25, the new formulation is a free-flowing liquid that may be added directly to plating baths without prior dilution.



It is said to be useful for applying a uniformly bright zinc plate to low-current-density areas such as recesses and threads. In the photo, the part in the foreground has been zinc plated in a bath that contained the new brightener.

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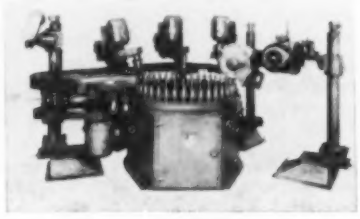
E—302. DEGREASER—The Vibra-Bantam, a new, small, low cost subsonic degreaser has been developed by Manpro Corporation. It features high production automatic in-line cleaning for all small parts, without manpower. The Vibra principle utilizes a vibrating spiral elevator to move the work rapidly through non-flammable cleaning solvents and vapors, thereby eliminating tote pans and baskets. The degreaser is compact, 20 in. square with a 42 in. overall height. Chips are automatically separated and clean dry parts continuously emerge ready for inspection.

E—303. ROTARY FINISHING MACHINE—A new versatile automatic rotary polishing and buffing machine that combines both indexing and continuous operation in one machine for production flexibility is now available from Acme Manufacturing Co. The machine can be converted, in less than one minute, from rotary indexing to continuous rotary motion or vice versa to permit finishing operations on a variety of parts.



With this combination drive feature, one machine can be used for both long and short run jobs. Because of the machine's flexibility, new jobs can be easily adapted to utilize either method in applications where production requirements do not justify two separate machines.

Parts such as: door handles, metal drinking tumblers, flash light cases, engine valves, coffee pots, plumbing fixtures and die cast parts of all types are adapted to finishing on this combination automatic rotary machine.

E—304. PHOTO RESIST—A new photo resist, called Resist-Etch, is said to positively block off unwanted electroplate and to permit accurately defined electroplated patterns in printed circuits calling for lines 0.005 in. wide, spaced 0.005 in. apart—even when used by relatively unskilled personnel. According to the announcement by The Meaker Company, subsidiary of Sel-Rex Corporation, Resist-Etch was developed specifically for quality etched copper circuits used in critical components for exacting military specifications.

Other features said to be proven in actual usage are: freedom from pinholes; unaffected by all plating cycles, yet easily removed by its companion product Resistrip; will not contaminate base or precious metal plating solutions; and freedom from toxicity.

E—305. BRIGHTENER—Conversion Chemical Corporation announces the development of a new, concentrated, permanent type brightener for cyanide zinc plating solutions called Kenvert No. 15-BR.

The product is a liquid, freely soluble in water, and in the zinc plating solution. It is said to exhibit stability to break down in zinc solutions operated at higher than normal working temperatures.

A further advantage is the fact that additions do not have to be made on a frequent basis. Additions on a shift or daily basis are adequate.

Kenvert No. 15-BR is claimed to give a full, bright range from high to low current density areas, making the product satisfactory for use in either rack or barrel plating baths.

The product is offered in 5-gallon pails with easy pouring spout. Complete compatibility with all of Conversion Chemical's chromating and bright dipping solutions is guaranteed.

E—306. ORGANOSOL COATING—A series of organosol coatings, Sterilkote 360, that gives metal adhesion with only one application and no primer has recently been introduced by the Bradley & Vrooman Company. Laboratory tests indicate the new one-coat organosols are more abrasion resistant than conventional coatings requiring two applications and priming.

Sterilkote one-coat organosols are vinyl resin based and may be applied by manual, automatic or electrostatic spray equipment as well as by regular and reverse roll-coaters.

E—307. CONVERSION COATING—Hanson-Van Winkle-Munning Company has announced the introduction of Chem-Rite C-55, a single dip chromate conversion coating process for cadmium. The process enhances the brightness of the cadmium deposit, produces a clear chromate surface and is easy to operate, according to H-VW-M. No subsequent

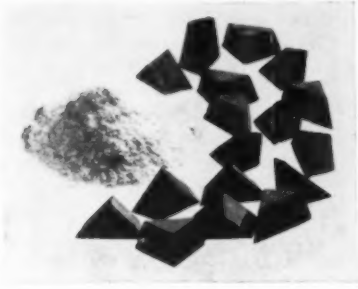
leaching is necessary as with some other cadmium bright dip treatments.

The chief use for Chem-Rite C-55 will be as a protective coating for hardware and other cadmium plated products that require long shelf life without discoloration and loss of brightness.

Chem-Rite C-55 can be used with any bright cadmium process, but it is claimed to be especially effective when used in conjunction with the new H-VW-M bright cadmium, Cadalume L.

E—308. BARREL FINISHING COMPOUND—A new burnishing compound devised to hold better color in barrel finishing zinc die castings has been announced by Minnesota Mining and Manufacturing Co.

The free flowing soap type compound also maintains color on steel and most alloys, the firm said.



The product is Honite brand One-Twenty-Six finishing compound. It and a tumbling shape announced in 1959, were developed to solve problems encountered in finishing zinc die castings. The lightweight chips, which are said will not gouge the soft metal and also help retain color, are Honite brand Z-N tumbling shapes.

E—309. ULTRASONIC CLEANING EQUIPMENT—Self-tuning ultrasonic cleaning equipment is now available on an off-the-shelf basis as a result of a new manufacturing method just established by Powertron Ultrasonics Corporation.

The Powertron Autosonic cleaners are the first to be offered for heavy duty industrial applications in fourteen separate series comprising different power levels and tank sizes.

E—310. WETTING AGENT—Conversion Chemical Corporation has announced a new liquid wetting agent known as Kenvert No. 15-WA for use with cyanide zinc plating solutions.

This product was originally developed to emulsify grease dragged into plating baths from insufficient metal preparation in the cleaning cycle. It was also designed to unplug the holes in plating barrels caused by break-down of brighteners in the plating solution.

In addition to these important factors it was found that better drainage of the zinc solution developed through lowered surface tension, and that the light foam blanket that developed on the solution stopped fuming, and decreased to a considerable extent the build-up of salts on anode bars.

Another important advantage offered by Kenvert No. 15-WA is the fact that it reportedly produces grain refinement and limited brightening. Kenvert No. 15-WA is compatible with practically all brighteners on the market.

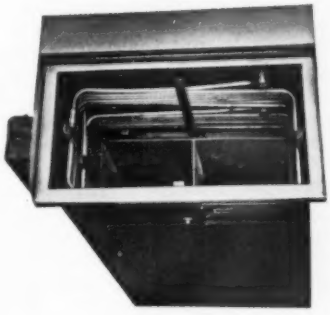
E—311. ALUMINUM COATING—Recently announced is the newly developed Alcorite IV Process by the Frederick Gumm Chemical Company. Aluminum treated in this process is said to withstand 250 hours of salt spray with little or no corrosion.

In addition to its protective coating, the company claims Alcorite IV provides optimum paint adhesion and combined Alcorite-paint coatings will resist 500 hours of salt spray treatment.

This simple low cost process can be applied by dip or spray and has been approved by the U. S. Navy for compliance with Specification MIL-C-5541 as applicable.

New-patented

TRISEC®
Spotless
DRYER



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This new patented "TRISEC" process provides rapid, thorough, stain-free drying of water-wet metal parts at low cost. The process is suitable for practically all articles, including glass, ceramics and metals. It can be used for intricately shaped parts with cracks and crevices as well as stampings, extrusions, castings, tubes, wire and strip.

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Bulletin 24

"TRISEC" is the registered trademark of Imperial Chemical Industries, Ltd. and this process is the subject of a U.S.A. and British patent pending. Phillips has been granted a license for the manufacture of the equipment and distribution rights of "TRISEC" in the United States.

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PERSONALS

JOSEPH AZZOLINO has recently been appointed technical director of E. C. Electroplating, Inc., Garfield, New Jersey. Prior to joining E. C. Electroplating, Mr. Azzolino was technical advisor on electrodeposition and surface treatments for the engineering, manufacturing and customer service department for the Wright Aeronautical Division of Curtiss Wright Corp.

He also served as technical sales and service representative for Heatbath Corp.

J. Azzolino

L. Withrow

LARRY WITHROW has been appointed vice president in charge of sales and chemical laboratory of Alco Chemical Corporation. Mr. Withrow was formerly vice president of Klem Chemical prior to joining Alco.

♦

DR. ROBERT H. REED has received appointment as vice president, development, of Solvay Process Division, Allied Chemical Corporation.

The appointment of Dr. Reed coincides with a major expansion of Solvay's research facilities at Syracuse, N. Y. now underway.

Joining Solvay in 1949, Dr. Reed has served as director of research, and assistant director of development. He was appointed director of development in 1960.

In his new position, Dr. Reed will continue to be located at Syracuse, N. Y., in charge of research, engineering, technical service and market research.

♦

MICHAEL KARP has joined Vitro Chemical Company as market analyst. He formerly had been on the faculty of the University of Pennsylvania and has also been employed by Thomassen & Drijver, Deventer, Holland as an economic analyst and by Eastman Kodak.

♦

A. EVERETT COOK, formerly chief production chemist of Tektronix, Inc. has accepted the position of plating supervisor and chief chemist of Winter Manufacturing Company in Portland, Oregon. He will be responsible for all production and research in the electroplating division.

Mr. Cook, recently elected president of the Portland Branch of the AES, was the chairman of the Branch's educational program co-sponsoring the electroplating course now in its third year at Portland State College, and is the corresponding consultant for the establishment of plating schools in Argentina, South America.

♦

STANLEY E. BACON has been named industrial sales manager for the midwestern region by Behr-Manning Co. Mr. Bacon, whose headquarters will be at the firm's Chicago offices, succeeds **ARTHUR W. BELL,** regional manager for the past 12 years. Mr. Bell asked to be relieved of immediate managerial duties but will continue his headquarters contact work with several large national accounts, working out of the Chicago branch.

Mr. Bacon has been with Behr-Manning since 1949, covering both industrial and general trades sales territories in St. Louis, Texas and Arkansas until 1957, when he was advanced to a divisional managership with headquarters in St. Louis.

S. E. Bacon

Dr. M. B. Melillo

DR. MANLIO B. MELILLO, an authority on chemical deposition of magnetic materials, has joined American Systems Incorporated. In this post, Dr. Melillo will manage a new magnetic components laboratory specializing in electroless coating of magnetic memory drums, disks and rods. Dr. Melillo was previously chief chemist for the Electrada Corporation, and prior to this, an assistant professor of chemistry in Naples, Italy.

♦

RONALD J. HURLEY has been appointed as general manager of the Acoustica division of Acoustica Associates, Inc.

PLATING MAGAZINE TECHNICAL ARTICLE REPRINTS AVAILABLE

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As general manager, he is responsible for the research, development and production of ultrasonic cleaning equipment, liquid level gaging devices and propellant utilization systems.

♦

GEORGE F. MATACEK has been named district manager of Bee Chemical Company's Western Division, Gardena, California.

Mr. Matacek was formerly chief chemist of the Western Division and served for several years as a group leader in research at the company's main laboratories before the formation of the Western Division.

G. F. Matacek

R. N. Kingsbury

RALPH N. KINGSBURY has joined Enthone, Inc. subsidiary of American Smelting and Refining Company, as a research chemist.

Mr. Kingsbury received a Bachelor of Science degree from Northeastern University and a Master of Arts degree in physical chemistry from Duke University. He was previously senior research chemist for the Sponge Rubber Products Division of B. F. Goodrich Company.

♦

LOUIS HOLLAND was named president of J. Holland & Sons, Inc. Mr. Holland has been active in the family concern his entire career, joining the company in 1921. In addition to administrative duties, he is now responsible for the company's inventory control program, operation of its manufacturing divisions and subsidiary operations.

WILLIAM HOLLAND, elected treasurer of the firm has also been with the company since the beginning of his career starting in 1918. As treasurer, Mr. William Holland is in charge of all financial administration as well as general management including sales and service.

ARTHUR HOLLAND, Mr. William Holland's son, was elected secretary. A recent graduate of Brooklyn Polytechnic Institute, Mr. Arthur Holland joined J. Holland and Sons, Inc. in 1950. His current duties are now involved in engineering, production and service operations.

ABRAHAM POLMAR who joined the J. Holland organization in 1933, has become vice president. Mr. Polmar's responsibilities include purchasing, office management and sales.

PLATING MAGAZINE

OPPORTUNITY TO AUTHORS

Member or non-member authors of technical and scientific papers on electroplating, metal finishing and allied arts are cordially invited to submit manuscripts of original, unpublished papers to the Editor of PLATING MAGAZINE for review and publishing consideration.

Any such paper accepted and published in PLATING will also be eligible for selection by the Society's Paper Awards Committee for the Carl E. Heussner AES Gold Medal Award; AES Silver Medal; AES Bronze Medal; George B. Hogaboom Memorial Nickel Plating Award; Robert S. Leather Mechanical Finishing Award; Chromium Plating Award; Precious Metal Plating Award of AES; John J. Hanney Memorial Copper Plating Award; Organic Finishing Award; Zinc Plating Award and the Aluminum Finishing Award of AES.

So as to expedite review and other processing, please write the Editor, PLATING MAGAZINE, 443-445 Broad Street, Newark 2, New Jersey, for full particulars, including a copy of "Publishing Specifications for PLATING MAGAZINE Authors", before submitting your manuscript.

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INDICATE A 329.

BRANCH NEWS

Total AES Branches U. S., Canada, Australia, March 1, 1961—59.

BRITISH COLUMBIA
Weekly Talks on Plating from Cyanide Baths

A technical meeting was held at the Loughead Hotel, Thursday, January 19, with 20 members present.

President **Gordon Smith** extended a warm welcome to the speaker **Chester C. Weekly** of MacDermid Pacific Inc., Torrance, California, as well as to a new member and a previous one reinstated.

Mr. Weekly gave a very interesting and informative talk on Plating from Cyanide Baths, as well as chromate and color dips, and displayed some excellent samples of zinc die cast and aluminum color finishes.

A most enjoyable discussion and question period followed, and the meeting was closed with a vote of thanks by **Bill Marquardt.**

C. Schlossareck
Secretary

BLUE RIDGE
Plans Completed for Third Annual Dixie Regional

The Blue Ridge Branch held its regular monthly meeting January 6, 1961 at the Hotel Roanoke in Roanoke, Virginia. The meeting was held at the site of the coming Third Annual Dixie Regional Technical and Educational Session. Nineteen members and guests attended the meeting.

A speaker was not scheduled for the evening meeting. The full time was devoted to the business session. The meeting was scheduled in this manner to permit completion of all plans for the Dixie Regional meeting.

A proposal was made to visit the corrosion laboratories of the International Nickel Company at Wrightsville Beach, North Carolina. This meeting will be held in June. Final plans are yet to be made.

Three new members were elected.

Donald H. McGee
Secretary

BUFFALO
Participating in Science Fair; Bueltman on Waste Treatment

The Buffalo Branch held its first meeting of the new year, January 6, 1961, at the Niagara Manor, Buffalo, N. Y. with 30 members and guests in attendance.

President **Harold Shapiro** introduced the guests of the evening: **James Gillone,** Wyandotte Chemical Co.; **Robert Oltarzewski,** Oakite Products; **Walter Swanton** and **Max Domros,** Pfaudler Co.; **Frank Verbocy,** McKaig & Hatch Co.

John Donaldson, chairman of the Membership Committee, announced each Buffalo Branch member will be contacted by mail and asked to submit the name of at least one new prospective member.

Chuck Fotheringham reported briefly on the success of the Christmas Party held December 3, 1960 and thanked all who attended for their support and especially his committee members, **Mel Stachura** and **Don Stackowiak.**

George Wolf, exhibits chairman of the Technical Societies' Council, Annual Science Fair, announced the fair is to be held in Buffalo, April 18–20, 1961. Mr. Wolf stated the Buffalo Branch will be awarded $15 for each booth secured through efforts of our Branch members.

It was announced by President Harold Shapiro that the nominating committee for Buffalo Branch 1961–1962 officers will consist of **Eric Sampson,** Chuck Fotheringham and **Jack Martin.**

Rolland Campbell read the proposed bylaws sent to him relative to regional conventions. Several of these proposals met with much criticism from Buffalo Branch officers and members and will be dealt with at the proper time.

John Tiebor introduced the speaker of the evening, **Charles G. Bueltman,** manager of waste treatment department, The Permutit Company, New York. Mr. Bueltman presented an interesting and educational talk illustrated with slides about Waste Treatment of Metal Finishing Solutions. The talk was followed by an informative question and answer period.

Robert C. Eich
Secretary

CENTRAL MICHIGAN
Walther Visually Presents Vibratory Finishes

The January 10 meeting of the Central Michigan Branch was held at the Hotel Hayes, Jackson, Michigan. The Branch enjoyed a presentation of slides and movies on Vibratory Finishes, given by **W. J. Walther** of the Roto-Finish Company.

A board of directors meeting has been called for January 31 at the Hotel Hayes, Jackson, Michigan, for the purpose of completing plans for our Annual Dinner Dance, which is always the ultimate of our social activities.

Robert E. Tobin
Publicity

CHICAGO
Gilbertson Made Branch Honorary Member; Winters is Speaker

The January meeting which was held on Friday, January 13, at Petricca's Restaurant, 510 North Western Avenue, was a joint meeting with members of the Chicago Branch of the Electrochemical Society. An excellent attendance of members from both branches were present for this meeting. **Jack Benta,** president of the Newark Branch of the AES was present at the meeting. **Hal Gilbertson,** grand old-timer was awarded an Honorary Membership of the Chicago Branch. **Willard Carter** and **Scott Modjeska** both reported that all the arrangements have been completed for the Annual Banquet on January 28.

The speaker of the evening was **John B. Winters,** president and technical director of Incar, Inc., who spoke on "The Anode's Side of the Story." The problems at the anode are two-fold 1) the contact of the anode on the bus bar must be kept clean, that is, free from plating salts, corrosion etc., 2) the anode also has current density variations. In the plating process, the current enters the anode and flows to the cathode where metal and hydrogen are liberated. At the anode, solution of the anode takes place and oxygen is liberated with a slight polarization taking place. Polarization may take place without a film formation or a film formation such as in tin plating. The anodes are polarized to form a greenish-yellow film and prevent formation of stannous ions in the plating bath. When polarization progresses 1) resistance shows up at a given voltage and 2) oxidation products are formed at the anode.

To avoid burning of parts due to stray currents in unlined tanks at the bottom of racks during cadmium plating, a barrier can be used at the bottom of tank. The barrier may be a wire-glass plate, PVC sheet, plastisol coated steel, etc. Sludge at the bottom of zinc plating tanks should be stirred up frequently to avoid the attack of iron by the cyanide solution. Silicates from cleaners which are dragged in zinc plating baths, which contain alloy anodes, tend to polarize easily because of the formation of films. Zinc metal tends to increase when the plating bath is not in use because of the dissolution of the anodes in the bath. A reverse current potential

BRANCH SECRETARIES

Branch News is required of all Secretaries monthly by AES Bylaws. First of the month is Branch News deadline for next PLATING issue. Any items on hand on that date will be carried in that edition. Later arrivals will appear in the issue immediately following. In reporting talks given by speakers before the Branch, please give titles of the talks, the speakers' full identification and any other pertinent information of interest to other Branches and PLATING's broad readership.

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of 2.1 volts to the anode will prevent this climb of zinc metal content.

Polarization in nickel plating baths can be detected because of the formation of sulfuric acid with a consequent drop in *p*H. Booster consumption increases and other detrimental products are also formed at the anode. In brite nickel plating, if the anode content is very low at the exit end of the tank, impurities will plate out causing the nickel to become passive. A used nickel anode has a greater surface area, due to its etched and pitted condition, than a new anode. The general rule is to load the tanks with anodes to avoid polarization. In chrome plating, the lead anodes must be placed in tank with the current on to avoid formation of lead chromate film. The lead chromate is a bad conductor of electricity and will not reoxidize trivalent chrome to the hexavalent state. Mr. Winters concluded by saying that the anode plays a definite function in the plating process. He illustrated his talk with slides and was given a rising vote of thanks after a lively question and answer period.

Christopher Marzano
Publicity Chairman

CINCINNATI
Additional Tri-State Meeting Favored; Geyer on Conversion Coatings

The January 25 meeting was called to order by President **Leonhardt** with 50 members and guests present. Five men were elected to membership. President Leonhardt appointed **Bill Stephenson** as the junior representative to the Tri-State Committee. He will serve with **Carl Truman.** The Branch then discussed the idea of an additional yearly educational meeting for the Tri-State Region. The meeting would be a one-day affair with educational sessions in the morning and afternoon and would exclude any social functions. The Branch is in favor of this project. The secretary then briefed the group on the upcoming Tri-State and Dixie Regional Meetings.

The topic of Chemical Conversion Coatings for Aluminum was discussed by **John H. Geyer,** technical assistant to the president, Amchem. Mr. Geyer pointed out that there are three basic types of chemical conversion coatings for aluminum: Namely, 1) trivalent chromic acid bath, 2) hexavalent chromic acid bath, 3) alkali baths. He then went on to discuss the acid type baths presenting background to their development and their application in today's market. The speaker also discussed the various methods of cleaning aluminum prior to conversion coating, and ended his talk with a discussion of MIL-C-5541, its proposed revision and its impact on the finishing industry. After a question and answer period, the group adjourned to the social hour sponsored by Amchem—**Fred Moser,** host.

David L. Kaplan
Secretary

DAYTON
Program Announced for Annual Event

The Dayton Branch of the American Electroplaters' Society will hold its Fifteenth Annual Educational Session and Dinner Dance on Saturday, March 4, 1961, at the Hotel Biltmore, Dayton, Ohio. The Honorary Chairman of the day will be AES National President **W. Andrew Wesley,** International Nickel Company, Bayonne, New Jersey.

Dayton Branch President **Byron A. Bowman** has appointed **Lawrence H. Hadlock** as general chairman, **Robert D. Fisher** co-chairman and the following committee chairmen: **Walter W. Anderson,** educational; **Albert W. Wendt,** tickets; **Jack V. Baker,** hotel arrangements; **John Easton,** program and advertising; **Robert Ruleff,** entertainment; **John Myers,** favors; **Duanne Prosser,** secretary; and **Roy Critchfield,** publicity.

The Educational Session will start promptly at 1:15 p.m. in the Hilton Room and will feature **Dr. Hyman Chessin,** director of research, Van der Horst Corporation of America, Olean, N. Y. whose topic will be "Adhesion of Electroplated Metals," **A. H. DuRose,** Harshaw Chemical Company, Cleveland, Ohio speaking on "Plating—Art or Science," and **William H. Safranek,** Battelle Memorial Institute, Columbus, Ohio who will report on "High Temperature Properties of Elec-

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troplates." The board of managers strongly emphasize that this session is open to everyone interested and that there will be no charge or registration fee to attend this meeting.

The evening festivities will begin at 6:15 p.m. in the Junior Ballroom with a Joint Suppliers Cocktail Party followed by the dinner to be served at 6:45 in the Main Ballroom. The price of the dinner tickets will remain at the previous cost of $7 per plate.

Entertainment Chairman Bob Ruleff has promised the (un)usual floor show preceeding the dancing to the music of a well known orchestra.

L. A. Critchfield
Publicity Chairman

DAYTON
Pocock Speaks on Water Soluble Resin

The regular meeting of the Dayton Branch was held January 18 at the Biltmore Hotel. Thirty-five members and their guests were present. In the course of the business meeting, **Larry Hadlock** reported on the Tri-State Meeting. **Walter Anderson** proposed a Work Shop session similar to that held by the Mid-Western group at South Bend. He suggested three panel groups to answer questions on plating, mechanical finishing and organic finishing. No social functions would be planned. His proposal was enthusiastically received. President **Byron Bowman** reported that **Robert Fisher** had been appointed Branch Research Chairman and Tri-State Regional Research Finance Chairman.

Ticket distribution for the Dayton Annual Educational Session and Dinner Dance on March 4, 1961 was begun.

Walter E. Pocock, development engineer of Allied Products, Inc. of Baltimore, Maryland discussed "Water Soluble Resin Systems as Plating Post Treatments." This talk concerned water soluble resin and uses in metal finishing. Color slides were shown which illustrated salt spray resistance and appearance of chromate and resin coatings over various metals and phosphate and resin coatings over bare steel. A brisk question and answer period was followed by refreshments through the courtesy of Allied Research Products.

L. A. Critchfield
Public Relations Chairman

DENVER
Waste Treatment Presented by Van Ettan

The Denver Branch met January 12 at the Oxford Hotel. After a short business meeting the librarian **Tom Stark** introduced the speaker for the evening, **Mr. Van Ettan** of the Martin Company. His subject was "Disposal of Plating and Plant Wastes." The speaker gave a short resume on maximum allowable concentrations of foreign materials which can be introduced into streams and other bodies of water. Detailed information was then given on the treatment of various wastes before discharge. Hexavalent chromium is treated with sulfur dioxide and lime. Cyanides are treated with chlorine and then lime. Volatile matter such as ammonium bifluoride and nitric acid are allowed to evaporate. Oils are separated and then burned.

Elmer A. Schuster
Secretary

DETROIT
Cox and Kifer on Plating Waste

The February 3 meeting of the Detroit Branch was devoted to the important subject of "Plating Waste: Why? What to do about it." The subject was thoroughly discussed by **Louis D. Kifer,** sanitary engineer of the City of Warren, Michigan and superintendent of the Warren sewage treatment plant, and **I. D. Cox,** industrial wastes engineer of the Monroe plant of the Ford Motor Company. The speakers were introduced by the technical chairman, **Richard A. Fellows.**

William G. Anderson
Public Relations Chairman

HARTFORD
Trouble Shooting Discussed by Ken Bellinger

The regular Branch meeting was held at

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the Bond Hotel on January 23, after being postponed for one week due to a snowstorm and 34 members and guests were present. Preceding the meeting an interesting movie on hunting was shown.

The guest speaker for the evening was **Kenneth Bellinger** of the Conversion Chemical Corp. whose subject was "Trouble Shooting in the Plating Room."

Mr. Bellinger's talk was given from the sales engineer's point of view and suggested that when in the plant, he perhaps can see a problem forming, or before it happens, and can make changes so that it will not interfere with production. He must decide whether to do the work there or send the problem back to the company laboratory, this will depend on the distance as the chances of getting a suggestion or recommendation accepted is easier if done right away otherwise the recommendations may be filed away.

When problems occur such as rejects, lack of uniformity, malfunction of bath, etc., listen to the operators and foreman for possible leads and avoid snap judgements. Get all the facts such as size of tanks (measure them), strength of solutions (analyze them), etc. Many problems caused by too cold water being used in plating, dipping or rinse tanks, poor housekeeping such as insufficient filtration, not filling up anode baskets, not cleaning anode bars, not removing the muck from the bottom of rinse tanks, lack of syphon breakers and the overuse of brighteners.

The technical chairman for the evening was **Eugene Chapdelaine.**

Stanley Platoz
Secretary

INDIANAPOLIS
Polishing and Buffing Materials Discussed by Welker

The Indianapolis Branch of the AES started the new year off with a well-attended meeting with 44 present for dinner and several more came in for the meeting. The meeting was opened by the president, **John Holland,** with introductions, reports of the secretary and treasurer. A note from **Tom Evans** and one from **Roman Bender,** who have been ill, were read. Both are improved and Mr. Bender hopes to attend the February meeting.

A letter of resignation was read from **Wes Cothran,** who is retiring. A motion was made by **Elmer Lundberg** and seconded by **Les Reynolds** and passed that Mr. Cothran be granted an Honorary Membership of the Indianapolis Branch.

Bert Hawhee reported on the Tri-State meeting at Columbus, Ohio on February 4, 1961.

Two applications for membership were presented. A motion to accept them was made by **Marshal Whitehurst** and seconded by **Dick Watson.**

The Branch was privileged to have **Harry Welker,** of Guide Lamp as its speaker. His subject "How to Train Foreman and Operators in the Most Efficient Use of Polishing and Buffing Materials." His 27 years of experience proved that he knew what he was talking about. There are four main points to be remembered: 1) Personal demonstration on the job training, 2) Classroom instruction and discussion of engineering principles, 3) Keep individual informed of progress, and 4) Follow-up.

Mr. Welker stressed that set-up is very important and employes should be taught the type of set-up suitable for production and see that it is followed. They should be taught to know types of buffs, how to adjust and also keep equipment in good repair at all times. Individuals should be kept informed of their progress as performance efficiency arises. Reports of production should be given daily. Follow-up to training program should be continuous. All supervisors are confronted with problems, new and old, and should reveal daily cost reports and also review how machine operator can improve. If this is done daily, corrected steps can be taken immediately. Regardless of size of job and application of materials, this is an important part of operation and will cause the employes to respond accordingly.

A question and answer session followed with much participation.

Edna Rohrabaugh
Secretary

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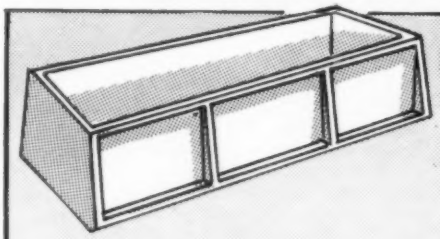

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KANSAS CITY
Wahlin Discusses Filtration

The regular November 17 meeting was held at the Berkshire Hotel. Twenty members and guests were present. The Barada and Page Company was host for the social period at 6:30 p.m. Dinner followed at 7:00.

First Vice President **W. E. DesJardins** presided in the absence of President **Warren Eliot.**

Treasurer **Robert Garland** reported on our fall social event, the trip to the KU-Oklahoma football game.

Mr. DesJardins reported on the activities of the Membership Committee.

Second Vice President **Robert Garrett** announced that he is proceeding with the proposed invitation for the Interim Meeting for Kansas City and expects to have this project completed by our December meeting.

It was voted that the secretary send a letter and token of appreciation to **Mrs. R. E. Loupee** for the work she did to make our fall social event an outstanding success.

W. E. Wahlin of the Industrial Filter and Pump Manufacturing Company of Cicero, Illinois, was introduced by Robert Garland. Mr. Wahlin spoke to the group on "Filtering Electroplating Solutions." In his talk he covered the elementary principles of filtration, the construction of filtering systems, and the pumps used in filtering devices. The construction of the filters themselves and the amount of filtering area for filtering different solutions at varying rates was covered in some detail. In concluding, Mr. Wahlin spoke of the importance of proper location and installation of filtering equipment.

Robert W. Davis
Secretary

KANSAS CITY
Viola Talks on Rectifiers

The regular December 15 meeting was held at the Berkshire Hotel. After the members had gathered informally, dinner was served at 7:00 p.m. Following dinner the meeting was called to order by President **Warren Eliot.** Each member was then called upon to introduce himself and his guests to the group.

First Vice President **W. E. DesJardins** proposed a new member. Mr. DesJardins talked for a short time about the various aids which are available to help in soliciting prospective members. While the Membership Committee plans to make wide use of these aids in their work, he emphasized that they are available for any member to use in contacting prospects.

Librarian **R. E. Loupee** spoke briefly on the importance of each member actively supporting the Branch by attending all the regular meetings and participating actively in the functions of the Branch.

The secretary read a letter from Member **James Tharp** in which he told of work he had done on the control of hydrocarbon contamination in vapor degreasers by using an IR-5 spectrophotometer. Any who have an interest along this line may contact Mr. Tharp directly or through the Branch secretary to secure a copy of the paper detailing the work Mr. Tharp has done.

President Eliot brought to the attention of the group the Proctor Award given by the National Society and spoke of the qualifications of the individuals who are considered for it.

James Viola, president of the Rapid Electric Co., was introduced to the group by Librarian Loupee. Mr. Viola addressed the group on the subject of "Silicon Rectifiers and Their Control Systems." As he spoke, he recorded his talk and the questions which were asked of him. If practicable, a transcript of the meeting will be sent to those members present. Mr. Viola made the observation that while rectifiers were old, well-known equipment they have, nevertheless, been constantly changing. Within the past two years or so there have been rapid improvements in both rectifiers and their controls. The characteristics of both silicon and selenium rectifiers were enumerated. In addition the advantages and disadvantages of the two types were discussed. A test device was used to demonstrate the property of silicon diodes to pass current in only one direction. Mr. Viola emphasized the importance of discussing with the supplier or manufacturer the problem under consideration before rectifiers and their controls were purchased. Many questions were asked by the members and in answering them Mr. Viola was able to go into some detail regarding specific problems.

Robert W. Davis
Secretary

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KANSAS CITY

Agitation in Plating Presented by Saltonstall

The regular January 12 meeting was held at the Berkshire Hotel. The MacDermid Chemical Co. sponsored a social period at 6:30 p.m. The social period was followed by dinner at 7:00.

Following dinner, the meeting was called to order by President **Warren Eliot.** Each member introduced himself to the group.

W. E. DesJardins gave a brief report on the progress of the Membership Drive. He then proposed four men for membership.

Scott Sterrett was presented a Past-President's Pin by Warren Eliot. In making the presentation, Mr. Eliot commented briefly on the work Mr. Sterrett had done and the service he had rendered to the Branch during his term of office.

R. L. Garrett spoke briefly to the group regarding the plans for inviting the National Society to Kansas City for the 1963 Interim Meeting.

Warren Eliot suggested that a meeting be held in the spring to which members' wives would be invited. After considerable discussion, Mr. Garland moved and **Robert Nederman** seconded that a social meeting be planned for March, April or May and members be urged to attend with their wives. This motion was carried. Mr. Eliot assigned the responsibility for planning a program to the Branch executive committee.

R. E. Loupee introduced **Dr. Richard Saltonstall** of the Udylite Corporation, guest speaker of the evening. Dr. Saltonstall's topic was "The Role of Agitation in Plating." After noting that the purpose of agitation was to prevent the stratification of solutions and uneven plating, he went on to detail the various types of agitation which are employed. The advantages to be gained from agitation in cleaning solutions, rinse tanks, pickling, stripping and electropolishing were also mentioned. In regarding plating solutions, the possible advantages of agitation such as lowered concentration of conditioning agents and improved coating brightnesses may be gained. Decreased polarization and better racking were mentioned as possible disadvantages. A movie showing the results obtained in a glass experimental tank by the use of air agitation was shown. In conclusion Dr. Saltonstall answered questions.

Robert W. Davis
Secretary

LANCASTER

Frant Speaks to Fellow Members; Six Past Presidents Receive Pins

The regular monthly meeting of the Lancaster Branch was held on Wednesday, January 11, at the Lincoln Woods Inn in York. Approximately 22 members were present, with **John Hoffert** of Snyder and Sons as a guest.

The business meeting began at about 8 o'clock. President **Sharretts** said that the meetings so far this year have been on Wednesday. The next few meetings he said would be held on Friday in order to determine which night brings a better attendance, and that later in the year a vote would be taken on whether to change the meeting night.

Past President's Pins were distributed to each of the six Past Presidents who were present.

The speaker for the evening was a Branch member, **Dr. Martin S. Frant,** who spoke on "Black Spots on Plating." A discussion followed the meeting.

M. S. Frant
Secretary

LOS ANGELES

Precious Metal Plating Discussed by Weisberg; Annual Meeting Planned

The regular meeting on January 11 was called to order by President **Frank Virgil.** Guests were introduced by **Ozzie Grisat,** the sergeant-at-arms.

First Vice President **Emmett Babcock** reported on the membership drive and asked the members of the Society to help in introducing the Society to potential members.

Mr. Babcock read the names of three applicants for membership in the Society and then introduced six men for acceptance into the Los Angeles Branch.

Bill Thomas, chairman for the Annual Technical Sessions and Dinner Dance to be held on April 8, reported on the progress of his committee. He reported full details to follow.

The death of **Ken Thompson** was reported. Ken was a former member of the Los Angeles Branch and was plating foreman of the Harcraft Division, Harvey Aluminum, Inc.

It was also announced that **Clare Ver West** is recovering from a recent illness and is back on the job part time.

Don Baudrand, educational chairman, introduced the speaker of the evening, **Alfred Weisberg,** vice president of Technic, Inc. Mr. Weisberg, whose topic was "Precious Metal Plating," colored his presentation with a brief history of the subject and discussed the various types of plating baths and problems encountered. His presentation was followed by many questions from the group.

Burton G. Adams
Publicity Chairman

MELBOURNE

Al Korbelak "Down Under"

The regular monthly meeting was held at the Royal Melbourne Technical College on November 17.

Glen Walker who represented the Branch at the Convention, reported the extreme interest of the Society in the

Australian Branches and passed on a request for more news from Melbourne.

Ren Hillhouse introduced **Al Korbelak** of Sel-Rex Corp. President **Bruce Leslie** was enthusiastic in his welcome to Al as guest speaker.

Mr. Korbelak's subject was "Modern Techniques and Applications of Industrial and Decorative Precious Metal Plating." He delivered a very comprehensive lecture on the plating of silver, gold and gold alloys, rhodium and platinum. In each case, he outlined the historical development of the modern baths, the leveling and brightening addition agents and the properties of the deposits. Many of the numerous applications in industry in the USA were new to us in Australia although post-war development of industry is changing the situation.

Questions asked covered many fields of American practice outside precious metals and continued, during supper, after the meeting was officially closed at 10 p.m.

MEMPHIS-MIDSOUTH

Ferris and Schlundt Speakers at Recent Meetings

A meeting was held January 27, 1961 at the American Legion Post No. 1, Memphis, Tennessee.

Douglas Ferris of International Harvester Company was guest speaker. His subject was Quality Control Procedures. Several applications of quality control techniques to plating operations were cited. A good discussion followed with many questions from the audience.

Twelve members and guest were present.

The November 25, 1960 meeting also was held at the American Legion Post headquarters.

R. L. Schlundt of Republic Lead and Equipment Company, Cleveland, Ohio, was the guest speaker. His subject was The Design and Construction of Lead Electrodes. The talk was well received by the audience. Much interest was expressed for the new aluminum hook for lead anodes.

Philip R. Dickinson
Branch Secretary

MIAMI

MacNeill Talks on Plating of Missiles

The January 20 meeting was opened by the presiding officer, **Earl Kennedy** at 8:15 p.m.

M. H. Dent will attend Dixie Regional Technical Session at Roanoke, Va., Feb. 3 and 4, 1961.

James Liles is in Veterans Hospital, Coral Gables, Fla. Membership was asked to send him a get well card.

M. H. Dent the Branch librarian introduced the speaker of the evening, **Charles E. MacNeill** of the Martin Company, Orlando, Florida. His subject was "Finishes, Coatings and Electroplating in the Missile Industry."

Mr. MacNeill indicated that the missile industry uses the entire gamut of finishes, from electroplating as a base coat for further finishing to electroplating as a final finish.

Metallic deposits of the base metals to the most exotic. The requirements are not only determined by a shelf life, of the particular object, under various conditions, but the resultant finish, e.g. reflectivity etc., is predetermined and must be achieved.

The work done to achieve the required result is extensive, but it must be done in an economical manner.

Had it not been for the anticipation of seeing the newly released film on the Bull Pup missile, Mr. MacNeill would probably still be answering the questions which his talk engendered. Our thanks to him and The Martin Co. for this very informative evening.

Abe Schorr
Secretary

MILWAUKEE

Stade and Caplan Address Separate Sessions

After the usual steak dinner at the Maryland Hotel, the members of the Milwaukee Branch convened on Friday evening, January 6, 1961 for a short business meeting.

First Vice President **Arthur Linn** realistically appraised the membership potential of the Branch. He predicted that the current net loss would be recovered and that there was a good possibility of a net gain for the fiscal year.

Clint Host, second vice president, reported that the Branch's exhibit promoting electroplating and metal finishing had been installed in the Public Museum and would be on display for approximately 90 days. His committee consisted of **Jack Achter, Phil Ritzenthaler, Stephen Choren, Eugene Johnson, George Fridl** and **Curtis Hunsaker,** and was aided by **Edwin Green** and **John Little** of the Museum staff.

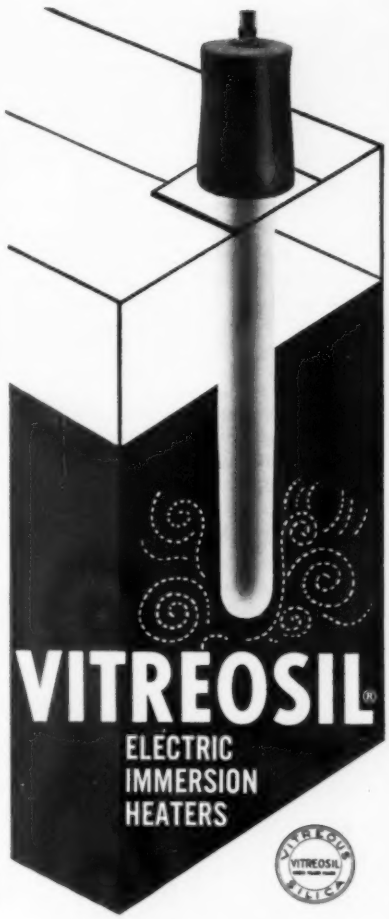
Welfare Chairman **Ted Sobczynski** reported the convalescence of **Henry Bornitzke** and **Robert Steuernagel** from serious illness.

An application for membership was approved and the applicant was welcomed as a member.

Cliff Peter spoke briefly on the subject "Why You Are Here." The discussion was not metaphysical but an earnest analysis of the benefits to be derived from membership in the Society and participation in Branch activities.

Curtis Hunsaker, librarian and program director, conducted the question box period after which the Organic and Inorganic Sections held separate meetings.

C. H. Stade, a liaison engineer for the Kanigen Division of General American Transportation Co., addressed the Inorganic Section on the subject of "Electroless Nickel."



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Richard E. Caplan, supervisor of the product development laboratories of Midland Industrial Finishes, talked to the Organic Section on "Texture Finishes."

Leslie L. Diveley

MILWAUKEE

Milwaukee Gives Aluminum Speaker High Rating

Jack Butler Kerr, a representative of the Reynolds Metals Company and a member of the Blue Ridge Branch of the AES, on February 3 spoke to the combined Organic and Inorganic Sections of the Milwaukee Branch on the subject "The Finishing of Aluminum."

Mr. Kerr spoke with evident authority on many aspects of the subject. His delivery, reminiscent of that of Tennessee Ernie Ford, was droll, and his remarks being both witty and pertinent maintained keen interest. After his prepared talk, he satisfactorily replied to a wide variety of questions. Those present would unanimously concur in giving Mr. Kerr an AAA speaker rating.

President **E. E. Piellusch** announced appointment of **Robert Steuernagel** as chairman of the Pabst Meeting and **Frank Dayton** as chairman of a Liaison Committee to work with the Milwaukee School of Engineering in a student training program.

The president also appointed **Herman Tessman, Henry Bornitzke** and **T. Sobczynski** to act as a Nominating Committee for the election of new officers.

Mr. Tessman, chairman of the 1962 Convention Committee, announced the appointment of **R. D. Wysong** to replace **Eugene Roth** as co-vice chairman. Mr. Roth recently resigned. Mr. Tessman also announced the appointment of **John Auchter** as chairman of the Outing Committee to replace **Glen A. Schwemer** who transferred to Los Angeles.

Promotion Chairman **Clint Host** announced that more than 10,000 people had seen the Branch's Exhibit in the Public Museum and that arrangements were being made to show it elsewhere.

MISSISSIPPI VALLEY

Fluid Bed Coatings Described by Rothschield

The January 18 meeting of the Mississippi Valley Branch was held at Pronger's Restaurant in Davenport, Iowa.

The meeting was called to order by Vice President **Wilbur McKay,** and a new member was elected.

Lloyd O. Gilbert, librarian, introduced the speaker of the evening **Max V. Rothschield,** of the Armstrong Products Co., Warsaw, Indiana whose subject was "Fluid Bed Coatings." Mr. Rothschield described and demonstrated some of the many uses of this coating process such as rack coatings, rapid masking, combined masking and decorating techniques, production and custom coatings. Mr. Rothschield was assisted in the demonstration by Mr. Gilbert. Following the talk Mr. Rothschield held an open question-and-answer session.

Following the talk, the librarian showed two films, "The Army Family of Missiles" and "Nike Zeus—The Anti-Missile Missile," which gave the Branch an opportunity to view our country's progress in missile defense.

Clyde Shepherdson
Secretary

MONTREAL

Guffie Discusses Racking

The last regular meeting of the Montreal Branch for 1960 was held at the Sheraton Mount Royal Hotel December 19.

The guest speaker for the evening was **J. Guffie** of Metal & Thermit Products of Canada Ltd. Mr. Guffie gave a very informative talk on "What Racking Can Do to Your Costs." Afterwards Mr. Guffie answered questions from the floor. He was thanked on behalf of the Branch by Mr. B. Millward.

Five new members were welcomed into the Branch at this meeting and two more applications were received.

G. Katronge
Secretary

MONTREAL

Snowdon and Sanford Speak on Paint Manufacturing

The January meeting of the Montreal Branch held at the Sheraton Mount Royal Hotel, January 16, 1961 was highlighted by a very interesting and informative educational session on the Manufacture of Paints. **Dr. H. Sanford** and **Mr. B. Snowdon** of the Glidden Paint Co. prepared a very interesting evening in which they illustrated by motion pictures the various stages in the manufacture of

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paints. This educational session presented some indication of the quality control and continued research in the modern paint plant.

During the business session of the Branch, one new member was welcomed.

G. Katronge
Secretary

NEWARK

Martini Expands Talk and Fills Gap Caused by Weather

With only a dozen members braving the weather on January 20 which had almost paralyzed the East, **Mr. MacKensie** of Yonkers (Phelps Dodge Copper Products Div.) was a very welcome visitor. Some of the members should ponder this.

It was moved and passed that a Newark Branch Manual be sent to **Ezra Blount** to be used in connection with AES National Educational Committee matters. The secretary was instructed to welcome **Ed Faint** back in the area by letter. There were no elections and Secretary **Don Foulke** was instructed to forward one application.

Librarian **Cy La Manna** introduced **Al Martini** of the Sel-Rex Corp. who proceeded to expand his "Timely Topic" into a full technical talk because the scheduled speaker, **Dr. Ed Saubestre,** was unable to get to Newark from New Haven. Al presented "Practical Hints on Gold Plating" covering the cyanide and acid types of gold being used widely presently. He also revealed that the neutral gold baths have interesting possibilities for directly plating such active metals as manganese and beryllium. Mr. Martini also reported one of the advantages of acid gold is the direct plating of phosphorous bronze, tellurium copper and beryllium copper, kovar, etc. eliminating the cyanide copper strike commonly used.

Al Korbelak gave the group the low-down (almost) on his recent trip to Japan via Hawaii where he was greeted by a girl with a kiss on the cheek and a lei. He was impressed with the neatness and modernity of the Japanese plating shops and the industry of the workers. He reported an industrial boom, which was contributing to the rapid expansion of modern plating facilities. They are using modern nickel, copper, chromium and gold plating processes he noted, full automatic barrel and rack plating equipment as well as the carousel type not often seen in the U. S. The question and answer period was of a somewhat less technical nature.

The meeting finally adjourned at 10:15 p.m. at which time the attendees quickly scurried over crunching snow, buffeted by screaming, arctic winds, to their cars and thence home—voting the meeting a pleasant one in spite of the low attendance.

D. Gardner Foulke
Secretary

NEW YORK

Foulke and Ostrow Talk on Gold Plating

The last meeting of the year on December 16 at the Hotel Statler was called to order by President **Joseph Rembecki.**

Motion made and carried that an application for membership follow regular course.

Following recommendations of board of managers, motion made and carried to accept two new members. They were duly sworn in by President Rembecki.

All banquet committees reported progress. All ladies attending the afternoon party will receive a gift at the door besides other prizes to lucky winners.

Librarian **Martin Pollack** reported three very good speakers for the technical session. The suppliers will offer a cocktail party after the technical session, then the banquet with a floor show and dancing for all.

Motion made and carried to allot $50 for expenses of delegates going to the AES Interim Meeting at Hartford, Conn.

The speakers of the evening were **Dr. Donald Foulke** of Sel-Rex Corp. and **Mr. Barnett Ostrow** of the Lea-Ronal Corp. They covered the History of Gold Plating to the present outer space age. They also covered new methods developed in recent years due to the demand for heavier deposits. Both speakers, experts in their fields, received a resounding round of applause.

This being our Christmas Party, the members and their guests were treated with refreshments at the conclusion of the meeting.

Fred Saras
Recording Secretary

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NEW YORK
Color Measurement Discussed by Levy

The first meeting of the year was called to order on January 13 by President **Joseph Rembecki.**

Motion made and carried that two applications for membership follow regular course.

Milton Nadel informed that **Dick Hartman** has contracted the orchestra and show for the banquet. The suppliers report that all arrangements have been made for cocktail party and it should be better than last year's.

Librarian **Martin Pollack** introduced **Dr. Levy** of the Photovolt Corp., who spoke on "Instrumental Measurement of Surface Color of Anodized and Painted Panels." Dr. Levy explained how the eye measures color and explained reasons for variations in shade when color matching by eye. He demonstrated by means of slides and tables how color measurement is accomplished with an instrument. Once you have the instrument readings recorded you can check any panel and if the readings correspond, the colors are matched. Dr. Levy demonstrated an instrument built by his company which utilizes filters to break the colors into the three basic measurements for colors. Any panel emitting the same readings would be perfectly matched. Dr. Levy's talk was very well received.

Fred Saras
Recording Secretary

PHILADELPHIA
McAleer Talks about Buffing; Rectifier Presented to Plating Class

The regular meeting was held at the Engineers' Club on January 23, with about 40 members and guests present. Librarian Marsh introduced **Howard J. McAleer,** president, Formax Mfg. Co., who spoke on "The Function of Buffing Wheels and Buffing Compounds." Covered by Mr. McAleer were the essential factors in obtaining the desired finish: design of part, metal, equipment, tools, wheels and compounds. Discussed in practical detail were important items in proper operation of polishing and buffing procedures, such as: lubricant in polishing, important role of operator, design and speeds of wheels, abrasives, binders, proper application of compound.

Raymond E. Morris, Branch member, presented in behalf of his employer, Fox Products Co., a portable rectifier to **Dr. Samuel Heiman** for use of his Branch sponsored electroplating class at Temple University.

Two applications for membership were received and four new active members were admitted. The minutes of the previous meetings were read and approved and the treasurer's report was heard. **Irvin K. Hauseman,** chairman of the

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Branch Sustaining Membership Committee, reported the appointment to the committee of **Robert H. Elliott,** three years, **Clarence E. Boerckel,** two years, and **Edwin F. Ottens,** one year. **Mr. Cogan** announced that Mr. Hauseman had been offered and had accepted Branch Research Finance chairmanship.

Mr. Cogan reported member **William H. Moyer** in the hospital and that flowers were being sent him in behalf of the Branch.

The secretary advised the Branch of the passing of **Otto W. Mott** on December 31 at the age of 89. Mr. Mott was a Branch Honorary Member and Branch Past President, serving from 1917 to 1920. The secretary was instructed to send Mr. Mott's family the condolences and sympathy of the Branch.

I. Wm. Marcovitch
Secretary

PHOENIX
Second Annual Christmas Dance Held

The second annual Christmas Dance was a great success with over two hundred in attendance. As proof that our members can do things other than dabble in cyanide solutions, you should have seen **John Mullarkey,** vice president of the Branch, jitterbug and win the contest.

The purpose of the dance was not only to entertain the members and friends, but to finance the adoption of a needy family for Christmas. Everyone is looking forward anxiously to the next social function of the Branch.

PHOENIX
Quality Control Discussed by Massie

The January Meeting was held at the Arizona Ranch House Inn at 5614 North Central.

After dinner **Floyd Huhn,** president, introduced one new member. **Joe Motil** introduced eight guests, **Noel Broome, Col. Ralph Rogers** and **James Massie,** USAF Air Procurement District; **Del Bjork,** Chem Research; **Larry O'Neil,** L'Hommedieu; **John Meng** and **John Urshal** of the Acme Plating Co.

Due to the lateness of the dinner, the business portion of the meeting was not held.

Bob Hays, Branch librarian, introduced James Massie of the USAF Air Procurement District, who gave a most interesting talk on "Reliability of Plating Through Quality Control." The main theme of the talk was that reliability which is in the inherent design can best be assured by process control.

Paul M. Wible
Secretary

PITTSBURGH
Conversion Coatings Presented by Jones

The January 11 meeting of the Branch showed a marked increase in attendance as a result of the efforts put forth by the Membership Committee.

A new member was elected.

A very interesting film and discussion of the subject of "Chromate Conversion Coatings—Including New Color Techniques" was presented by **William C. Jones** of The Chemical Corp. This presentation was concluded with a question-and-answer period.

Clyde A. Mungall
Secretary

PROVIDENCE-ATTLEBORO
Christmas Party Delayed by Blizzard

December's news is very short. A real New England blizzard. Nothing moved, including the electroplaters.

The January meeting was rescheduled to Tuesday, the 10th, and was held at the Wayland Manor at Wayland Square, Providence. This was called a "Delayed Christmas Party." A delicious roast beef dinner was served to 40 guests and members.

We have to thank **Jerry Noonan** for the way he handled this affair, especially since he had to do everything over after December's blizzard.

Dan Cashman of the University of Rhode Island won the prize of the evening —a transistor radio—donated by the George Mann Company. Other fine gifts were donated by other companies.

Bill Chase of Agate Lacquer was there to give us some of his excellent advice. **Dean Crawford, Dan Cashman** and **Dr. Mohrnhiem** of the Engineering School at U.R.I. were present. A good time was had by all.

At a short business meeting, it was decided not to hold the spring plating seminar at the University this year because of the conflicting dates with the National Convention at Boston.

C. I. Healy
Secretary

ROCHESTER
Kubis Discusses Metal Cleaning

The January 9 meeting of the Rochester Branch was called to order by President **John Cipollo.** After a short business meeting, the speaker of the evening was introduced by Librarian **Loring F. Carson.**

The speaker was **E. J. Kubis** of the Wyandotte Chemical Corp. He gave a talk on "Alkaline Salts and Organic Acids Used in Metal Cleaning."

After the meeting refreshments were served through the courtesy of Wyandotte Chemical Corp.

Peter VanDilst
Secretary

ROCKFORD
Employe Testing Presented by Giesel

To start the 1961 calendar year off with a record turn-out, President **Harold Ellis**

invited interested personnel directors of area industry to join us at the Faust Hotel on January 9 to hear **Robert (Bob) Giesel,** president of Adolph Plating Co., Chicago, Ill., speak on "Testing Personnel for Plating Room Employment." A very representative number of area personnel managers from leading industry were present.

The scientific materials and methods of pre-employment testing were outlined by Mr. Giesel, who is currently applying this program to lower employe-turn-over in his job plating operation with a normal payroll of over 200 colored production workers. Various tests designed to determine general intelligence levels, judgment, inspection ability, etc. are given to all job applicants while additional tests for manual dexterity are added for those being considered for racking and packing operations. Continuance of job-interest without creating demands beyond the employe's scope have brought about the determination of minimum and maximum ratings acceptable. A very lively discussion session covering everything from incentive programs, absenteeism and comparative wage scales followed.

Following the general meeting, President Ellis called a short meeting of all committees involved in the plans for the Branch Annual to be held at the Faust Hotel on March 11. Educational committee chairman, **Robert Campbell,** announced the confirmed program for both the morning and afternoon sessions: **Ezra Blount,** editor of *Products Finishing* will discuss "Surface Treatments Prior to Finishing" and **A. T. Leonard,** past president NAMF will outline "The NAMF's role in Metal Finishing."

The afternoon sessions will again feature the annual workshop on metal finishing problems to be moderated by **Leonard Weeg,** National Lock Co. and the panel will consist of **Art Bartman,** Bell & Howell, Chicago, Ill.; **Dick Giesel,** Adolph Plating Co., Chicago, Ill.; **Henry Bornitske,** Cutler-Hammer, Milwaukee, Wis. and **Chet Borlet,** Grand Rapids Brass, Grand Rapids, Mich., AES National First Vice President.

The evening will be capped off by a suppliers hospitality party and a gala banquet and dance. We are all looking forward to a good turn out.

Alexander Alexander
Publicity Chairman

SPRINGFIELD
Golf Outing Planned; Bikales is Speaker

The Springfield Branch met at Wayside Restaurant in West Springfield, on Monday evening January 23, for the regular monthly meeting. There were 29 members and guests present.

After the several reports were read and discussed, **Elery C. Gibson,** chairman of the activities committee reported on the coming Turkey Shoot, to be held on Sunday, February 19, at the Whippernon Club, in Russell. He said the total shoot would be limited to 50 entrants. There will be four regular shoots and a grand shoot, plus five big door prizes. As usual, a capacity crowd is expected. From the Turkey Shoot announcement, Mr. Gibson went on to explain the final plans for the annual golf outing, installation of officers and banquet were being firmed up. The affair will be at the Whippernon Club, in Russell, on June 10, which falls on a Saturday.

Robert Girard extended an invitation for members to sit in at the Interim Meeting, to be held at the Statler, in Hartford on Saturday, February 11, and the Old Timers affair, to be held at the Saengerbund Hall, that same evening. Springfield Branch has chosen **Philip W. Prouty** to represent the Old Timer from this area.

One candidate was welcomed into membership in the Branch.

Henry L. Heissfeld, Branch secretary, submitted for comment a copy of an emblem he had designed for approval by the Valley Council of Technical Societies. Springfield Branch is a member organization of the Council, and this emblem was considered quite symbolic of the purposes of the group. The design will come up for vote at the next meeting of the Council, January 26.

After the business portion of the meeting was completed, the program was turned over to Robert Girard, acting as technical chairman, in the absence of **Leo Diamond.** Bob introduced **Richard G. Bikales,** technical service engineer of Metal & Thermit Corporation, Rahway, New Jersey. Mr. Bikales spoke on "Duplex Chromium." This is a comparatively new process and there was much interest shown in the subject matter.

Mr. Bikales shares the concern of many, for progress and ever-increasing standards in the electroplating industry. He believes that the future of the plating industry is as bright as the chromium itself.

Henry L. Heissfeld
Secretary

SYRACUSE
Branch is Guest of Brown-Lipe-Chapin, Division of GM

At 2:30 p.m. on the 18th of January, 52 members of the Syracuse Branch assembled at the Brown-Lipe-Chapin plant in Syracuse for an excellent guided plant tour during which the membership was shown and explained the zinc die casting, the stamping, the polishing and the plating operations.

For many of the members this was a real opportunity to observe automotive handling and plating of automotive parts in their finest performance. After about a two-hour tour and a short discussion during the tour, conducted by **Frank**

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INDICATE A 346.

Syracuse Branch during visit at Brown-Lipe-Chapin plant hear Manuel Ben present paper on aluminum plating.

Corso, Kim Parnell and **Joe Simmons** of the Brown-Lipe-Chapin staff, members of the AES as well as the firm of which we were the guests enjoyed a very fine dinner provided by our hosts.

After dinner, **Manuel Ben,** of the electrochemistry department of the Research Laboratories of General Motors and second Vice President of the AES, gave a progress report on the latest developments in plating on aluminum. Mr. Ben discussed various plating methods on aluminum from the past on up to the more modern methods, taking advantage of the use of zincate or anodizing pretreatment in order to make the aluminum ready for the final plating operations. He, very extensively, discussed the comparison between the CASS test and tests run on the roof of the Ternstedt Building DT in Detroit. The lecture was illustrated with various interesting slides and Mr. Ben's conclusions and summary pointed out a very interesting development in recent plating on aluminum methods, namely that a zincate, zinc plating, copper strike, acid copper, nickel duplex system and chromium seems to be the best possible means of obtaining the most favorable corrosion resistance results with no massive blistering after a period of exposure.

A very lively and lengthy discussion followed after the talk during which time our Honorary Member, **Dan Gray,** took a very active part. It should be mentioned here that it was learned during that discussion that Dan Gray actually had been plating since 1900; some 61 years in the plating field.

A special word of thanks goes forth from the Syracuse Branch to **Ed Kaegi,** general manager, and **Don Nimmo,** director of public relations of Brown-Lipe-Chapin. These two gentlemen made it possible for the very grateful members of the Syracuse Branch to enjoy a very interesting educational and social visit at their magnificent plant.

R. Sonnenfeldt
Recording Secretary

TORONTO

Newman Speaks on Hard Anodizing

Des Newman, a member of the Toronto Branch, was the guest speaker of the Branch's monthly general meeting held in the Algonquin Room of the Royal York Hotel, January 13.

His excellent talk on the definition and application of hard anodizing was well presented and served to point out the oft neglected field of speakers at Branch Meetings available within their own memberships.

Al Adams introduced the speaker and he was thanked by **A. T. Patterson.**

President **G. Lince** and **R. Day,** members of the committee organizing the

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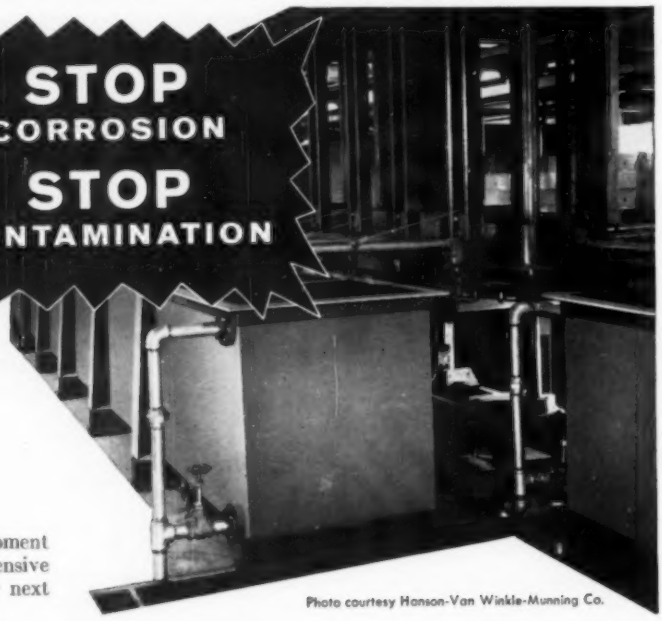

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Toronto Branch's Technical Symposium to be held in the spring, called on the membership at large to assist in spreading the good word of this new venture which it is hoped will set many new records.

Brock Laws, chairman of the entertainment committee, announced that in addition to the annual fishing trip planned for the spring, a golf tournament was also being organized as a brand new activity of the Branch and would be held in the latter part of June. Definite dates and places are expected to be announced at the next general meeting.

Al Adams of the speaker committee announced that **Ken Bellinger** would address the members at the February meeting on Conversion Coatings.

Brock W. Laws

WATERBURY

Bockris Speaker at Sustaining Members Night

The Waterbury Branch held its annual "Sustaining Members Night" on Thursday, January 12 at the Roger Smith Hotel. A large turnout of members and representatives of many of the Sustaining Members of the Waterbury Branch were present. Vice President **Louis Porretti** opened the meeting.

It was announced that **William Gray** will be the Waterbury Branch's "Old Timer" to be honored at the "Old Timers' Night" which will be held in conjunction with the Interim Meeting in Hartford on February 11. Mr. Gray is a charter member of the Waterbury Branch and was Branch President during the years 1921–25, 1930 and 1931. He was foreman of finishing at the Waterbury Buckle Co. until he retired in 1940. In 1948 Mr. Gray was elected an Honorary Member of the Waterbury Branch.

The speaker of the evening was introduced by Technical Chairman **Raymond Mitchell. Dr. John O'M. Bockris,** professor of chemistry, University of Pennsylvania spoke on "Atomic and Ionic Movements in Electrodes." Dr. Bockris developed the information covered in his talk in the course of directing AES Project 16 which deals with the Mechanism of Electrodeposition. Dr. Bockris gave an excellent presentation covering his work and the many guests had an opportunity to get an insight into the scope and caliber of the work being carried on with their help.

F. A. Schneiders
Publicity

PLATING MAGAZINE invites AES Branches to furnish news for publication in PLATING concerning electroplating courses sponsored.

BRANCH EDUCATION

AT MILWAUKEE

It is reported that 25 science students at Marquette University wish to form a discussion group on the industrial aspects of metal finishing. Frank Dayton has been named chairman of a Liaison Committee to the Milwaukee School of Engineering.

AT WATERBURY

A progressive step has been taken at the high school level in Waterbury, Conn. The Waterbury Branch is cooperating with a program to supply experienced platers as guest teachers in local high school chemistry courses.

ELECTROPLATING COURSES

BROOKLYN, N. Y.—Ft. Greene Evening High School
Louis Serota, Instructor
18-wk. course—Fee: None

CHICAGO, ILL.—Illinois Institute of Technology
J. M. Andrus, Instructor
18-wk. course—Fee: $80

CLEVELAND, OHIO—Max S. Hayes Trade School
H. Pochapsky Instructor
15-wk. course—Fee: $11

INDIANAPOLIS, IND.—Purdue University Extension
Dr. A. M. Max, Instructor
16-wk. course—Fee: $45

MONTREAL, QUE.—Polytechnique Institute
Dr. Andre Hone, Instructor
3-year course—Fee: $50

NEWARK, N. J.—Plants and Laboratories in Area
F. J. LaManna, Instructor
14-wk. course—Fee: $25

NEW HAVEN, CONN.—New Haven College
L. J. Durney, Instructor
15-wk. course—Fee: $50

PHILADELPHIA, PA.—Temple University Technical Institute
Dr. S. Heiman, Instructor
4 Semesters, each 16 wks.—Fee: $37 per Sem.

PORTLAND, OREGON—Portland State College
Dr. J. R. Mickelsen, Instructor
10-wk. course —Fee: $10

PROVIDENCE, R. I.—Central Senior High School
Omer Jette, J. Fogarty, J.Castriotta Instructors
2-year course—Fee: None

ST. LOUIS, MO.—Hadley Technical H. S.
Dr. Otto C. Klein, Instructor
16-wk. course—Fee: $10

SAN ANTONIO, TEX.—Trinity University
W. P. Wisdom, Instructor
18-wk. course—Fee: $10

SAN FRANCISCO, CAL.—Cubberly H. S., Palo Alto
William Ferry, Instructor
24-wk. course—Fee: $3 per 12wk semester

SOUTH BEND, IND.
Dr. H. J. Wiesner, Instructor

SPRINGFIELD, MASS.—Chicopee Vocational H. S.
R. J. Girard and E. F. Koetsch Jr., Instructors
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VANCOUVER, B. C.—Vancouver Technical School
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EVANSVILLE, IND.—Joseph B. Kushner Electroplating School
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SANTE FE SPRINGS, CAL.—Weiner Electroplating School
Milton Weiner, Instructor, 12631 Imperial Highway
3 courses, each 12 weeks—Fees: $30 and $40

The above listings were correct so far as could be ascertained at press time. Prospective students are urged to verify courses and fees prior to making definite plans.

AES MEMBERSHIP REPORT

ELECTIONS

Blue Ridge: J. M. Stogner, D. C. Roy, F. Bunker
Boston: R. B. Roy, P. H. McNally
Bridgeport: D. G. Brown, A. D. Simpson
British Columbia: E. Klein
Buffalo: R. Oltarzewski
Cincinnati: J. Jessee, A. Kirkendall, W. Scarpinski, W. Sipe, J. Komar
Dallas-Ft. Worth: G. S. Brown
Dayton: C. F. Wollenhaupt
Detroit: V. P. Aluzzo, C. G. Fossati, J. A. Michelson, M. R. Morrison, C. T. Schmoke, C. V. Wilkie
Grand Rapids: J. R. McNellis
Indianapolis: D. G. Lawrence, J. O. Harshman
Kansas City: R. E. Harris, B. F. Walraven, C. B. Painter, D. E. Ketner, C. R. Hatfield, A. G. Widner, R. K. Asher
Milwaukee: D. Flood
Newark: M. Sandor, W. Pike
New York: L. Gutnaier, J. Whiteley, J. Tribolzik
Pittsburgh: R. M. Chandler
Providence-Attleboro: J. R. Smith
Rochester: E. W. Mattheis
Springfield: W. P. Cunningham
Sydney: S. Maguire, R. S. Bartels, W. T. Fallshaw
Toledo: W. Ehmann
Toronto: D. Young, H. Weinberg, D. R. Johnston
Member-at-Large: M. J. Law, D. J. Miller, K. C. Shah

REINSTATEMENTS

Boston: R. T. Marshall, A. J. Jorjorian
British Columbia: B. Lyhen
Buffalo: D. G. Black, J. Geary
Detroit: D. W. Dyer, E. M. Bunjac, J. Toth, J. M. Northrup
Hartford: E. Gardner, R. Elston, D. Nordstrom, B. Johnstone, E. Fargo, E. Michno, R. Ramsay F. Kukish, D. Kushman
Newark: D. Wahler, L. Jarecki
New York: J. J. Hayes, S. Ratoff
Member-at-Large: J. B. Bello, H. Knocker

TRANSFERS

Bridgeport: P. Veit from New York, A. Jocis to Dallas-Ft. Worth
Detroit: J. Toth to Indianapolis, K. H. Wagner to Pittsburgh
Louisville: J. P. Muscarella to Philadelphia
Philadelphia: J. P. Muscarella from Louisville
Pittsburgh: K. H. Wagner from Detroit

SUSPENSIONS

British Columbia: H. W. Neil, M. W. James, J. Stonberg, R. Stotz
Dayton: I. W. Kendall
Hartford: J. Hughes
Milwaukee: F. L. Dousman

DEATHS

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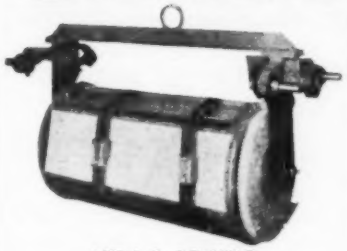

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	A	B	C	D	E	F	G
TO PLUG HOLE SIZE	1/8-3/16	3/16-1/4	1/4-5/16	5/16-1/2	1/2-5/8	9/16-11/16	5/8-3/4
TO CAP STUD SIZE	3/32-5/32	5/32-3/16	3/16-1/4	1/4-5/16	5/16-3/8	3/8-7/16	5/16-1/2

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AMERICAN ELECTROPLATERS' SOCIETY

March 3-4, 1961—**Philadelphia Branch Annual Technical Session and Banquet,** Benjamin Franklin Hotel, Philadelphia, Pa.

March 4, 1961—**Dayton Branch 15th Annual Educational Session and Dinner Dance,** Biltmore Hotel, Dayton, Ohio.

March 11, 1961—**Rockford Branch, Annual Meeting,** Faust Hotel, Rockford, Ill.

March 28, 1961—**Toronto Branch, "First Symposium on Metal Finishing,"** Seaway Hotel, Toronto, Ontario, Canada.

April 6-7, 1961—**Editorial Board Meeting,** Statler-Hilton Hotel, Detroit, Michigan.

April 8, 1961—**Los Angeles Branch,** Annual Educational Session and Dinner Dance, Statler Hilton Hotel, Los Angeles, Calif.

April 14-15, 1961—**Executive Board Meeting,** National Headquarters, Newark, N. J.

April 15, 1961—**Baltimore-Washington Branch,** Annual Banquet and Dance. Presentation of the "Order of the Pot,' Baltimore, Maryland.

April 22, 1961—**Twenty-Second Annual New England Regional Meeting,** Hotel Statler, Hartford, Conn.

April 24-25, 1961—**AES Research Conference,** Bell Telephone Laboratories, Murray Hill, N. J.

April 26, 1961—**Research Committee Meeting,** National Headquarters, Newark N. J.

April 29, 1961—**Milwaukee Branch Annual Educational Session and Banquet,** Schroeder Hotel, Milwaukee, Wis.

May 2, 1961—**Central Michigan Branch Annual Educational Session and Banquet,** Hotel Hayes, Jackson, Michigan.

May 5-6, 1961—**Rochester Branch Fiftieth Anniversary Celebration Concurrently with Empire State Regional Annual Meeting,** Hotel Manger, Rochester, N. Y.

May 6, 1961—**St. Louis Branch,** Annual Banquet, Sheraton-Jefferson Hotel, St. Louis, Mo.

June 10, 1961—**Pittsburgh Branch,** Ladies' Night Dinner Dance, Churchill Valley Country Club.

June 18-23, 1961—**48th AES Annual Convention,** Hotel Statler, Boston, Mass.

January 13, 1962—**Ninth Interim Meeting, Supreme Society,** Hotel Marott, Indianapolis, Ind.

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February 10-11, 1962—**Fourth Annual Dixie Regional Educational Meeting,** Dinkler-Plaza Hotel, Atlanta, Georgia

June 25-28, 1962—**49th AES Annual Convention,** Schroeder Hotel, Milwaukee, Wis. Sponsorship Midwest Regional Council.

June 24-27, 1963—**50th AES Annual Convention,** Ambassador Hotel, Atlantic City. N. J. Sponsorship Newark Branch.

June 15-18, 1964—**51st AES Annual Convention,** Sheraton-Jefferson Hotel, St. Louis, Missouri.

June 16-18, 1964—**Sixth Industrial Finishing Exposition,** St. Louis, Missouri.

June 28-July 1, 1965—**52nd AES Annual Convention,** Statler Hotel, New York, N. Y.

June 1966—**53rd AES Annual Convention,** Hotel Fontainebleau, Miami, Florida. Dixie Regional Council, Sponsor. Southeastern Branch, Host.

INTERSOCIETY

March 20-24, 1961—**American Society for Metals, 12th Western Metal Congress and Exposition,** Pan-Pacific Auditorium, Los Angeles, Calif.

Apr. 30-May 4, 1961—**The Electrochemical Society, Spring Meeting,** Claypool Hotel, Indianapolis, Ind.

May 2-4, 1961—**16th Purdue Industrial Waste Conference,** Purdue Memorial Center, Purdue University, Lafayette, Ind.

May 22-26, 1961—**American Society of Tool and Manufacturing Engineers,** Engineering Conference and Exhibit, New York, N. Y.

May 27, 1961—**Masters' Electro-Plating Association,** 43rd Annual Banquet, The Plaza Hotel, New York, N. Y.

June 16-19, 1961—**National Association of Metal Finishers,** Annual Convention, Statler-Hilton Hotel, Boston, Mass.

June 25-30, 1961—**American Society for Testing Materials, Annual Meeting,** Chalfonte-Haddon Hall, Atlantic City, N. J.

June 26-27, 1961—**American Vacuum Society,** 5th Annual Conference on Vacuum Metallurgy, co-sponsored by New York University, at University Heights Campus of N. Y. U.

October 1-5, 1961—**The Electrochemical Society, Fall Meeting,** Hotel Statler, Detroit, Mich.

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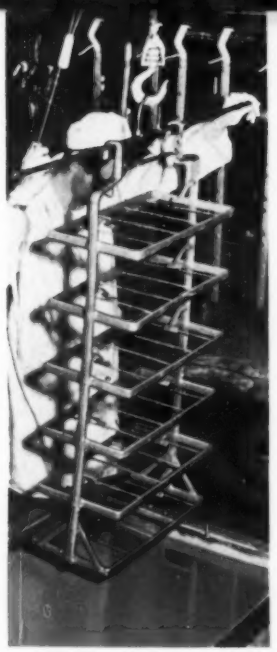

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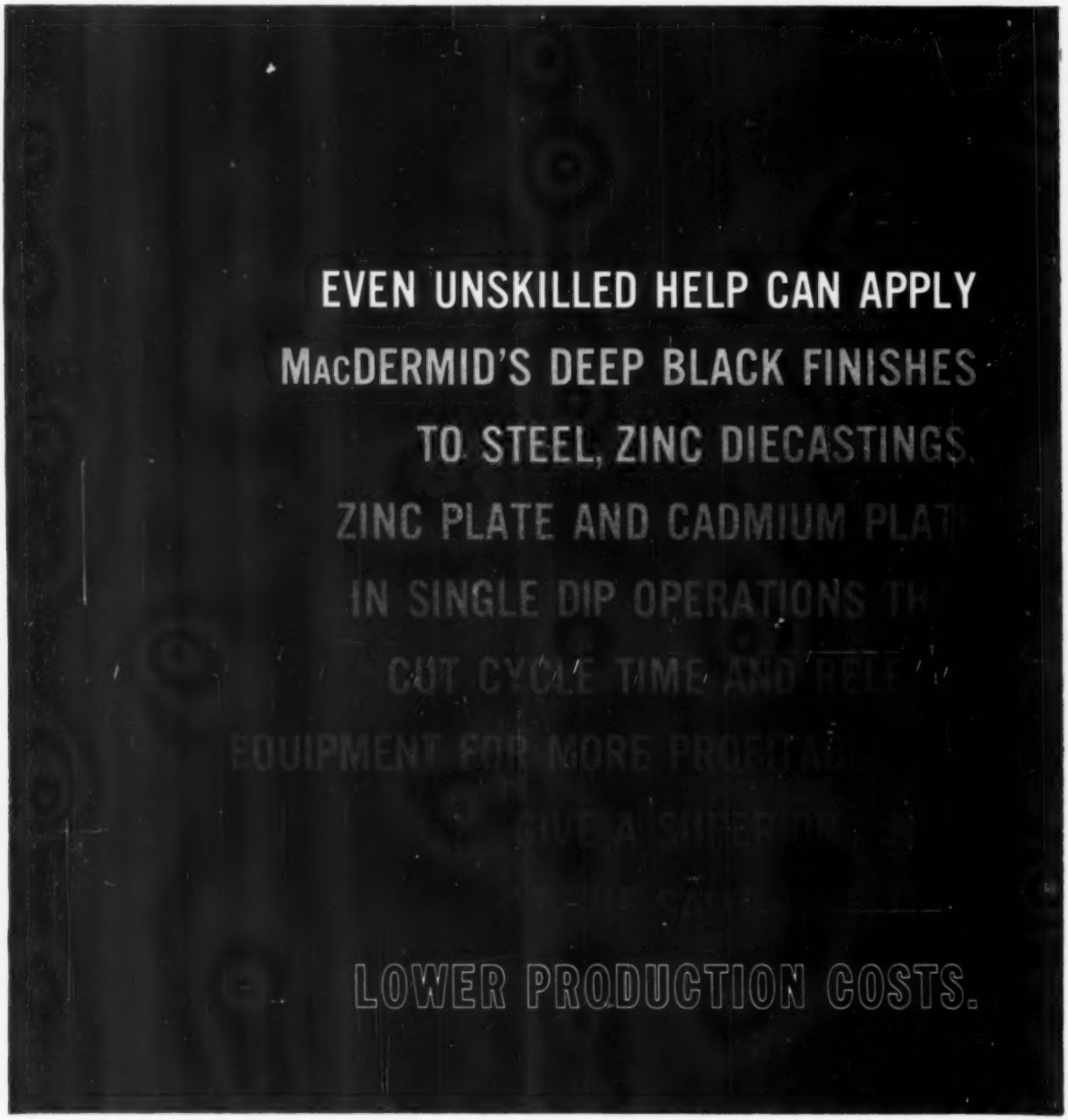
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